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THE WATER WORKS SYSTEM OF THE PAN-AMERICAN CITY.

"PUT me off at Buffalo," will be a favorite expression with the sightseer this summer, and particularly popular with the city official. The human tide has already turned in that direction. The Pan-American Exposition has much to attract and interest the average city official and municipal student, but no exhibit will be more keenly enjoyed, from a practical standpoint, than the city of Buffalo itself.

But few cities are as well governed as Buffalo. It is one of the best paved cities in the United States, having more than 4,000,000 square yards of asphalt pavement alone—almost as much as New York City. Its system of parks and boulevards is unexcelled, and when the scheme is fully developed it will have few equals. The Health Department, judged from the standpoint of organization, administration and equipment, is without a peer. Its public utilities—including the gas, electric lighting, water and street railways—are up-to-date, comparatively well managed, and, taken together with the commercial *esprit de corps*, lend a metropolitan air seldom found in a town of its size. Its fire and police departments are well organized, equipped and efficient. For these reasons it will be advisable for the city official and others interested in municipal affairs to allow at least one day in ten to investigate these excellent civic features.

It is worth a trip across the continent to examine the water works of the Bison City, for the system has some unique features which place it at the head of the water works systems of the world. The story of its growth from a comparatively insignificant plant to its present gigantic proportions is not the least interesting part of the plant.

The city was served by a private company, with varying success, up to 1868, when the citizens became so dissatisfied with the work of the corporation that an act of the Legislature was secured authorizing the city to construct and maintain its own water

works system. At this time \$705,000 were paid for the plant of the private corporation, which consisted of about thirty-four miles of pipe, varying in size from a 3-inch main to a 24-inch main; two pumping engines with an aggregate capacity of 10,000,000 gallons per day; one reservoir holding 11,000,000 gallons; and a tunnel 330 feet long and four feet in diameter. The city was exceedingly generous to the private company, for a careful estimate made at the time showed that the plant could be duplicated for \$500,000.

To-day the system is a giant as compared with the plant of 1868. The distributing mains cover an area of 25,000 acres with a net-work of iron pipes, ranging in size from the smallest up to forty-eight inches, being 490 miles in extent. From a nominal value of \$705,000 it has grown to be worth \$9,000,000.

The distributing reservoir, finished in 1893, is located in about the center of the city, covering an area of about twenty acres, having a capacity of 116,000,000 gallons. It has an elevation above the level of the water at the inlet pier of 116 feet, and above sea level of 684 feet.

The supply is inexhaustible, as the intake is located in the middle of the Niagara River within one mile of Lake Erie.



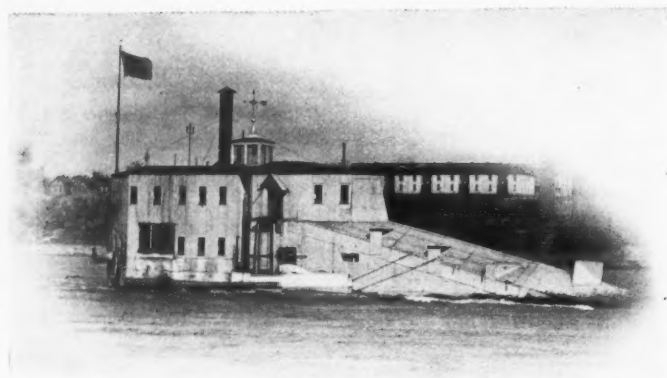
LOUIS H. KNAPP,
Engineer.



FRANK J. ILLIG,
Superintendent.



JAMES F. CROOKER,
Registrar.



BUFFALO WATER WORKS—INLET PIER IN CENTER OF NIAGARA RIVER.

The water is received from the river through two tunnels, one equivalent in area to a circle six feet and the other nine feet in diameter. These tunnels run out into the river, at right angles with the bank, about one thousand feet, and are thirty feet apart. They are unlined, having been hewn out of the solid rock. The inlet is protected by a pier of cut stone masonry, which was completed in 1874. The tunnels connect with the inlet by shafts, one measuring six feet and the other six by twelve in diameter. The average depth of the water at the inlet is fifteen feet, and the lower part of the intakes are located six feet above the bottom of the river. The current varies from six to fourteen miles an hour, depending somewhat upon the velocity of the wind.

During the winter season much trouble is experienced with ice, as large fields are constantly passing down the river from Lake Erie. For this reason the intakes have to be protected with steel shields, which project two feet from the pier and extend down within two feet of the river bottom. The shields are provided with gates opposite the intakes, which are closed when the ice is running, when the supply is taken from the bottom of the shields. Ordinarily this is sufficiently effective, but there are times when the river is filled with "slush ice," extending down to the bottom of the river. Then the ice enters the intakes and shafts in large quantities. Ice elevators are maintained at both the intake pier and at the shore end of the tunnels, and there are times when it requires the combined efforts of all means, human and mechanical,

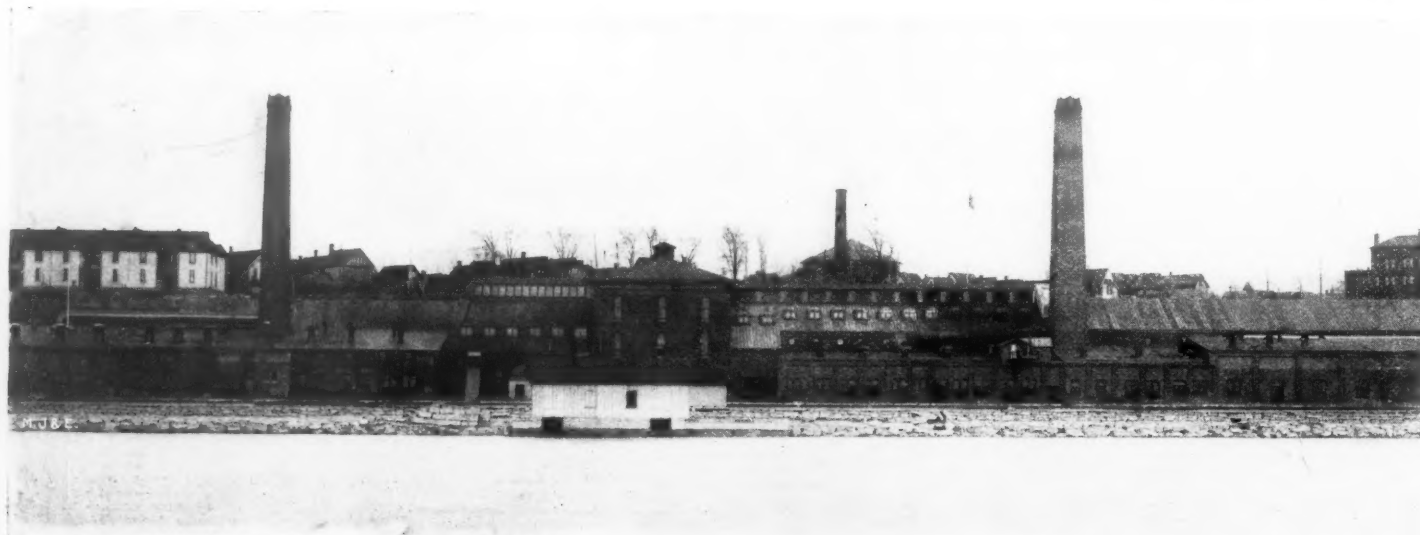
connected with this portion of the service to keep free from anchor ice.

The purity of Buffalo's water supply, all things considered, compares favorably with that of other cities which do not employ filters. The bacteriologist makes a daily examination of the water to determine the number of micro-organisms in the supply. By this means the presence of bacterial flora in dangerous quantities is readily detected and the public warned. For instance, in 1894, when Buffalo had an epidemic of typhoid fever, the bacteriologist discovered the danger and warned the health commissioner before the epidemic broke out. An abnormal amount of pollution was discovered and the health commissioner found, upon investigation, that, on account of some emergency at the pumping station, an old and abandoned intake had been opened and water from the Buffalo ship canal was pumped into the city mains. The old intake was sealed and abandoned forever, but not before a large amount of pollution had been pumped into the distributing system. Although every precaution was taken to prevent evil results, it was without avail, as the epidemic broke out four days later; but it is undoubtedly true that a more serious trouble was prevented by the warning from the bacteriologist.

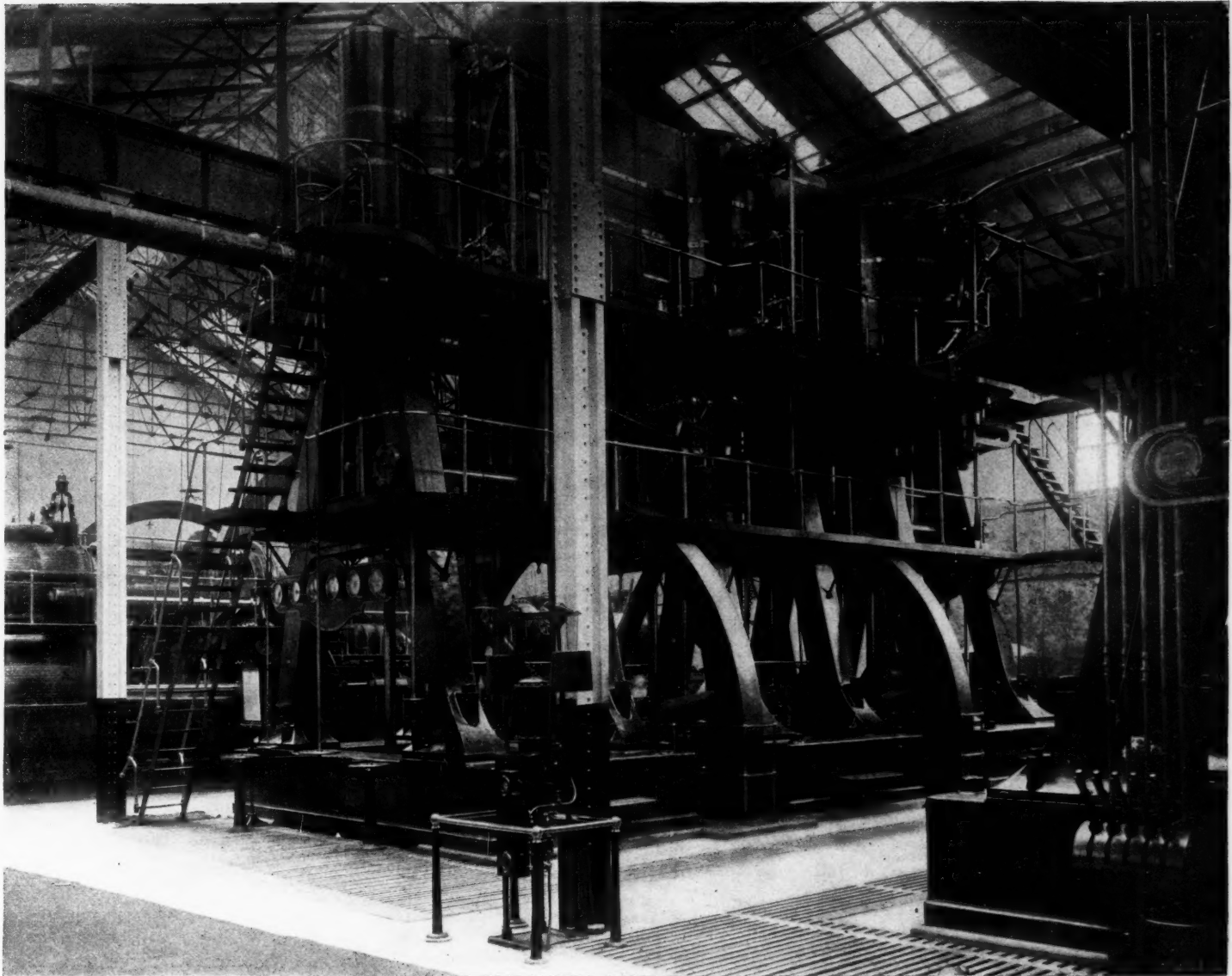
The pumping station of this system of water works is the largest in the world. It has a daily capacity of 187,000,000 gallons, which is almost equal to the flow of the river Thames! To drive this immense volume of water through a system of mains 490 miles in extent requires the use of a proportionately large horse power. The total capacity of the station, reckoned in horse power, is 6,880. The power is developed by thirty-four horizontal return-flue boilers, fitted with smokeless furnaces.

There are three Worthington pumps, one with a capacity of 12,000,000 gallons and two of 20,000,000 gallons each; four Holly pumps, one with a capacity of 15,000,000 gallons and three of 20,000,000 each; and two Lake Erie pumps, each with a capacity of 30,000,000 per day.

The Worthington and Holly pumps are of the horizontal compression type and the Lake Erie, triple expansion. A more detailed description of one of the largest pumps cannot fail to be of interest. The last of the two thirty million gal-



BUFFALO WATER WORKS—VIEW OF PUMPING STATION FROM THE NIAGARA RIVER.



BUFFALO WATER WORKS—LAKE ERIE ENGINE, 30,000,000 GALLONS CAPACITY.

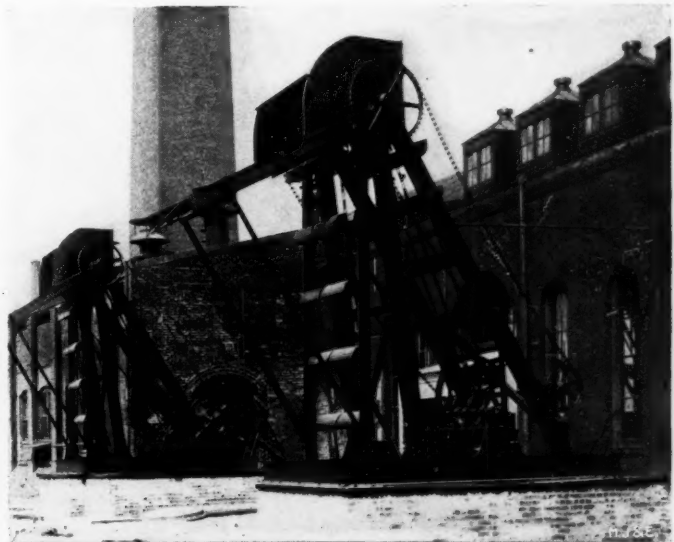
lon pumps was installed at an expense of \$64,250, and is almost an exact counterpart of the other. Its principal dimensions are as follows:

Number of steam cylinders.....	3	
Diameter of the high-pressure cylinder...	37	inches.
Diameter of the intermediate cylinder...	63	inches.
Diameter of the low-pressure cylinder...	94	inches.
Diameter of the two piston-rods.....	5	inches.
Stroke of the engine.....	60	inches.
Number of pumps.....	3	
Diameter of each plunger.....	42	inches.
Diameter of each of the four plunger-rods	5.5	inches.
Diameter of air-pump.....	33	inches.
Number of gallons of water pumped by each revolution	1,079	
Capacity of engine in 24 hours.....	30,000,000	gallons
Number of valves in pump chambers.....	1,188	
Diameter of valves.....	4.75	inches.
Diameter of each of the two fly-wheels...	20	feet.
Weight of fly-wheels, each.....	32	tons.
Diameter of discharge pipe.....	48	inches.
Horse power of engine.....	1,200	

The average daily amount of water pumped during 1900

amounted to 109,371,992 gallons, or a per capita consumption of 310 gallons per day. This is another unique feature of the plant, but not to its credit, for it makes the city the most wasteful in the world.

There is no guess work about the amount of water



BUFFALO WATER WORKS—ELEVATORS TO KEEP ICE OUT OF TUNNEL.

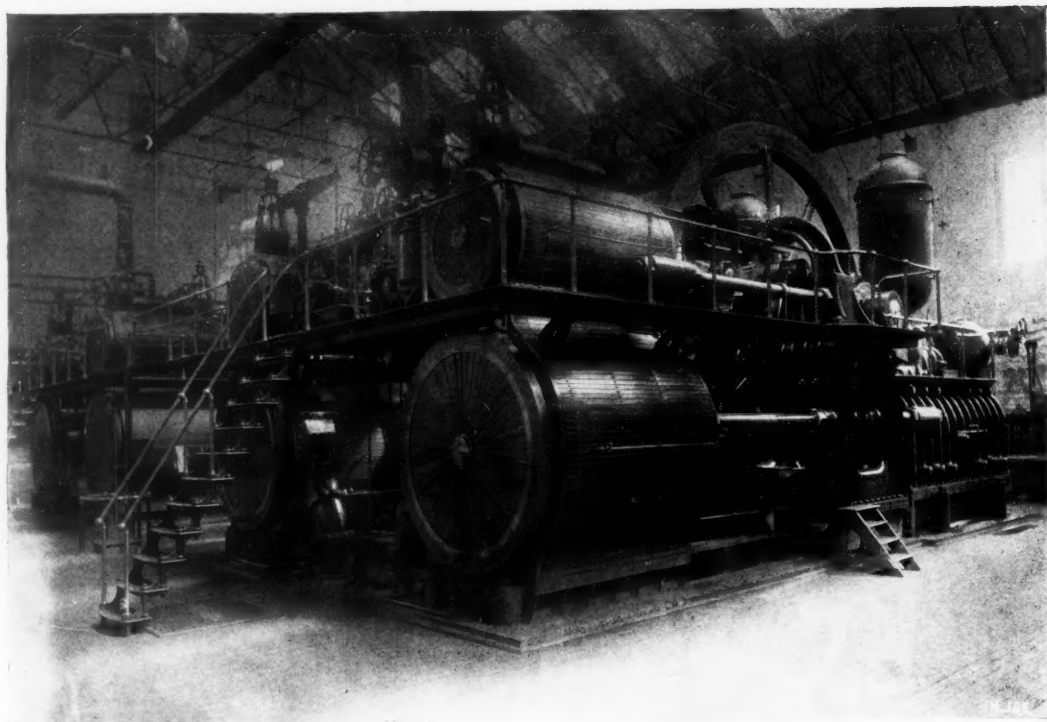
pumped at this immense pumping station for it is accurately measured by a 48-inch Venturi Meter, made by the Builders Iron Foundry, of Providence, R. I. The register of this gigantic meter is located in the engine room, where its record can be read by anyone.

Late returns from the cities and towns of the United States make the average consumption of water, per capita, per day, seventy-five gallons. This shows that Buffalo wasted water in 1900 at the rate of 82,810,945 gallons every day! Based on the rate at which London uses water—thirty gallons per capita per day—this waste would supply a city with a population of 2,760,365. This undesirable state of affairs is brought about by the interference of the people, who will not permit the plant to be run upon a business basis. Usually when a plant which is operated by a city is mismanaged, the fault is charged to the administration, but in this case the people are the direct cause of this deplorable condition. Superintendent Illig has repeatedly urged that he be authorized to gradually introduce the use of meters on the domestic service, but without avail. It has been shown that thousands of small consumers permit their water to run the year through; in the sum-

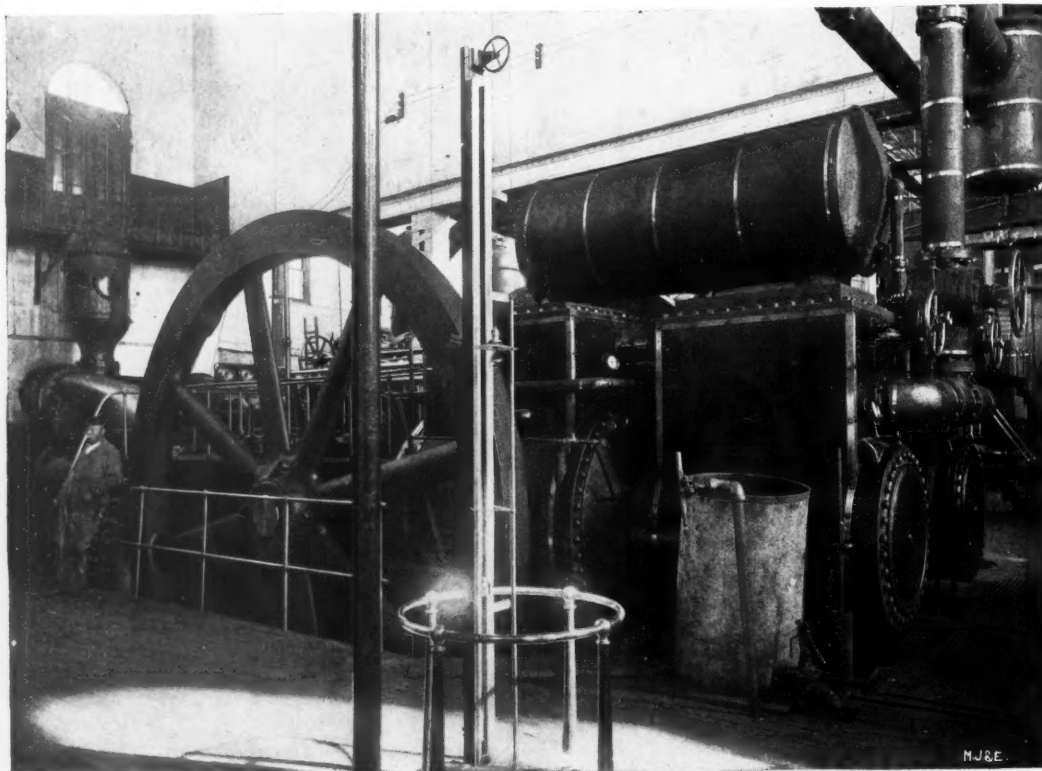
mer to keep it cool and in winter to keep the pipes from freezing. Besides this there are numberless other people, of all classes, who permit a leaking pipe, water closet or other fixture to go for months without attention, as it saves them a plumber's bill and does not increase their water rent.

The superintendent, in a communication to the commissioners of the board of public works, some weeks ago, cited, among other arguments favoring the use of meters, the experience of Detroit. "The use of meters introduced in Detroit, in 1886," said Mr. Illig, "has enabled that city to hold its pumpage at a stationary figure for ten years, although its population has increased 75,000. This indicates a fixed consumption for ten years, with a 56 per cent. increase in population and a per capita decrease from 203 to 130 gallons. This was accomplished by metering about 5,000 consumers out of a total of 49,000."

The experience of the following group of cities, in the use of meters, demonstrates conclusively that the waste is needless, both from an economic and sanitary standpoint, for it will be seen by the figures given that the other cities show up to a much better advantage;



BUFFALO WATER WORKS—HOLLY-GASKILL ENGINE, 20,000,000 GALLONS CAPACITY.



BUFFALO WATER WORKS—WORTHINGTON ENGINE, 20,000,000 GALLONS CAPACITY.

WHERE METERS REDUCE THE WASTE.

	Population, Census, 1900.	Consumption, galls. per day.	Consumption, daily, per cap.	Average annual receipts.	No. of taps.	Taps metered, per cent.	Death rate.
Buffalo, N. Y.	352,219	109,371,992	310	\$650,000	64,638	1.62	13.92
Atlanta, Ga.	89,872	5,444,000	60.	133,800	9,275	91.64	23.01
Bayonne, N. J.	32,722	3,071,000	93.	139,000	3,000	100.	....
Brockton, Mass.	40,063	1,165,000	29.	77,000	5,275	81.51	11.43
Covington, Ky.	42,938	2,500,000	58.	75,000	5,300	78.30	22.54
Fall River, Mass.	104,863	3,805,000	36.	168,600	6,943	94.25	18.35
Newton, Mass.	33,587	2,086,000	61.	131,000	7,087	84.68	....
Pawtucket, R. I.	39,231	6,524,000	185.	193,000	8,293	76.80	16.21
Providence, R. I.	175,597	10,130,000	57.	577,587	21,566	82.60	18.01
Woonsocket, R.I.	28,204	933,000	33.	72,800	2,347	91.01	....
Worcester, Mass.	118,421	7,920,000	66.	262,175	13,292	94.31	15.20
Yonkers, N. Y.	47,931	3,627,000	75.	147,944	4,968	97.67	16.42

The pumping station is lighted by its own electric light plant, which was installed and equipped at a total expense of \$9,151. There are forty-six arc lamps of 160 candle power each and 450 of sixteen candle power each. The dynamos were furnished by the Ridgeway Dynamo and Engine Co., of Ridgeway, Pa.

While the plant has never been a startling success, from a municipally owned and operated standpoint, nevertheless it is quite true that the people have received a better and more liberal service than would have been the case under private ownership. There are abundant opportunities for economizing, which, if the people would only permit him, would be improved by Superintendent Illig. By putting into practice some of the needed reforms, the use of meters being the most urgent and salutary in possible good results, the plant might be made one of the models of the country. But until the newspapers lend a hand in throwing some needed light on the practical value of meters it is not at all likely that the water works of the city of Buffalo will occupy any more exalted position than at present for many years to come. The financial statement covering the last two years is a creditable showing and speaks well for the present administration when the various obstacles are taken into consideration:

	1899.	1900	1899.	1900.
Deficiency, Jan. 1..	\$491,369.06	\$364,217.78	.....	.....
Receipts, collections, Jan. 1 to Dec. 31..	.....	.....	\$707,054.62	\$650,822.94
Disbursements, Jan. 1 to Dec. 31.....	579,903.34	526,705.36	.....	.....
Deficiency, Jan. 1, 1900 and 1901.....	.....	.....	364,217.78	240,100.20
	\$1,071,272.40	\$890,923.14	\$1,071,272.40	\$890,923.14

RECEIPTS.

	1899.	1900.
Water rates	\$436,765.45	\$424,316.61
Meter rates	103,391.81	108,698.00
Sundries (collected from City Depts.)...	140,321.19	96,437.24
Building rates.....	3,355.57	2,413.01
Corporation taps.....	2,404.50	1,094.50
Labor and supplies.....	5,036.44	4,149.61
Street sprinkling	341.14	343.37
Sale of old material.....	1,782.80	472.50
Flushing	5.50	6.10
Turn-on fees	390.00	298.00
New boxes	1,608.95	107.45
Circus rates.....	25.00	35.00
Street paving	275.02	203.48
Service leaks	1,333.39	462.10
Pipe extension.....	9,920.86	11,185.97
Tapping fines.....	1.00	Nothing
	\$707,054.62	\$650,822.94

DISBURSEMENTS

	1899.	1900.
By salaries, regular employees.....	\$165,316.57	\$172,101.02
Fuel consumed and on hand.....	49,697.69	64,789.26
Interest (yearly) on bonds.....	164,119.24	145,194.24
Principal on bonds.....	32,500.00	37,500.00
Unloading and trimming coal.....	3,653.25	4,570.40
Extensions and improvements, and maintenance and repairs.....	164,616.59	102,550.44
	\$579,903.34	\$526,705.36
Total receipts for year.....	\$707,054.62	\$650,822.94
Total expenditures for year.....	579,903.34	526,705.36
	\$127,151.28	\$124,117.58

Although the present capacity of the plant is far beyond the real needs of the city, yet it will soon be unable to meet the growing demand made by the immense waste. For this reason a second pumping station is contemplated, for which plans have been prepared and approved, with a minimum capacity of 200,000,000 gallons per day. It will be located on the shore of Lake Erie with its intake one mile from shore, connected by a tunnel thirteen feet in diameter.

In comparison with the Boston Water Works, although the population of Boston is twice that of Buffalo, the amount of water consumed in Buffalo is more than twice the amount used in Boston. The cost and revenue of the Boston water works are four times those of Buffalo, while the operating expenses are only doubled.



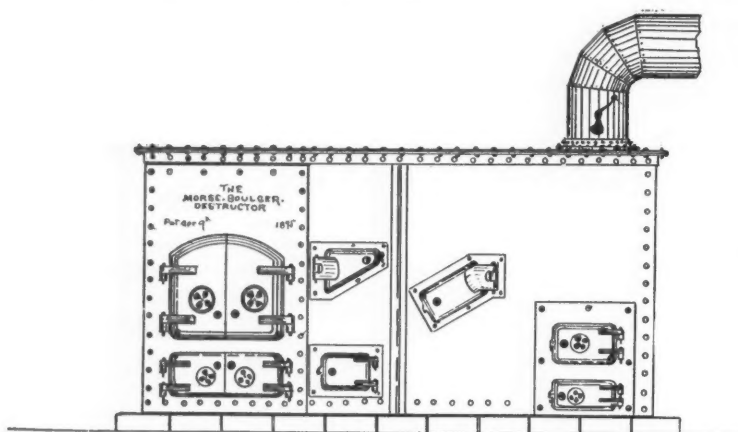
BUFFALO WATER WORKS—PROSPECT RESERVOIR—CAPACITY, 116,000 GALLONS.

THE DISPOSAL OF THE WASTE OF INSTITUTIONS.

BY W. F. MORSE, SANITARY ENGINEER, NEW YORK CITY.

IN all institutions devoted to the service of the public, like hospitals, asylums, sanitariums, reformatories and prisons; in the large modern office buildings, apartment houses, and hotels; in department stores, warehouses and all kinds of manufacturing establishments there is necessarily produced a volume of waste that demands daily attention and disposal.

The quantity and character of this waste is determined by the number of the inmates, their occupation or employment, the kind of manufacturing carried on, and the particular uses to which each building is devoted.



PLAN OF INSTITUTIONAL GARBAGE DESTRUCTOR.

In public institutions and asylums the amount of kitchen garbage and waste food products far exceeds the proportionate quantity from the same number of private persons. A hospital with five hundred inmates will have a daily amount of 1,000 to 1,800 pounds of putrescible matter, besides a large bulk of combustible refuse. In a city this may be taken away by the street cleaning service, provided that it is delivered in a separated state, unmixed with other matters, necessitating a considerable number of cans or barrels to be daily handled and stored. The long intervals of time between removals cause annoyance from the presence of offensive matter, and with any interruption of service it may become a source of danger.

From medical colleges, clinics, schools and bacteriological laboratories there comes a class of specially dangerous and obnoxious waste which cannot be treated in the ordinary way, that must be disposed of by some absolutely sanitary and efficient means, and, for which, cremation is the only safe method.

Apartment houses and hotels often contract for the sale of their kitchen garbage to men who feed it to swine, transporting through the streets large quantities in insanitary and ill-smelling carts. The quantity of combustible waste—paper, rags and discarded household articles—that accumulates in buildings where individuals cannot destroy it in their own apartments is enormous in volume.

Office buildings and mercantile houses are frequently compelled to destroy large amounts of private documents and records, which cannot be converted to use. These are burned under the boilers, creating a nuisance by the discharge of floating particles of charred fragments which descend from the tall chimneys upon adjacent habitations.

For weeks at a time last summer, at certain hours of the day, the atmosphere of Broad, Wall and Exchange streets, of New York City, were laden with floating ash and half-burned scraps of paper. On one particular day the sidewalks and pavement in the vicinity of the United States Custom House were literally carpeted with the discharge from the high stack of the building, and the occupants of the adjoining office rooms, although it was one of the hottest days in summer, were compelled to close the windows to keep out the floating particles of burned government records.

Manufacturers of every class give attention to the by-products of their business, working over and saving everything that can be converted into money; yet there is always more or less of residuum that must be taken away or destroyed, and this is frequently a refractory and difficult waste to deal with.

In a general way, there is discarded and left over the articles and substances that enter into the life of the people after every form of employment and usefulness has been served, a great mass in weight and bulk of useless matters, and the proportions that comes from the communal life of persons gathered in large numbers within the walls of a single building is considerably greater than the same number of people would produce under other conditions.

Since, then, the production of waste is one of the necessities of life, it concerns us to discover the simplest and most efficient means of treating this waste and of providing protection from personal annoyance, discomfort, and possible disease which may come from its unsanitary treatment.

Ten years ago New York City was compelled to adopt some means for destruction of the infected bedding, clothing and household equipment from the homes of patients ill with



GARBAGE DESTRUCTOR PLANT OF KINGS COUNTY.

infectious disease. A cremating furnace was built at the city disinfecting station, in which articles not worth cleaning by steam disinfection were destroyed. These had heretofore been burned in the open air, in an unsatisfactory manner, after removal to the hospital grounds at North Brother Island. It was found that this apparatus was an admirable adjunct to the Health Department, and when during the epidemic of typhus fever in 1896, it was necessary to destroy thousands of mattresses and other articles from the infected districts, there was ready at hand a practical and efficient means of destruction that could be relied upon. After ten years of constant service, with some changes and necessary repairs, this furnace is in nearly as good condition as at first, and is now used to destroy the garbage and miscellaneous waste of Willard Parker Hospital, the Reception Hospital and all contaminated articles from the city that are not worth disinfecting by the steam or formaldehyde processes.

In 1894 the New York Hospital on East Fifteenth street, near Fifth avenue, installed a crematory furnace under the enclosed court of the building, and connected it with one of the chimneys of the hospital. The kitchen garbage, with the manure from the ambulance station, and all the general miscellaneous refuse, a daily quantity of 1,800 to 2,500 pounds, is destroyed by the labor of the firemen who attend to the steam plant, and the use of 250 to 300 pounds of coal. This work has been carried on for seven years in the heart of the city with no offensive odors or fumes, and with a certainty and rapidity which no other method of disposal can approach.

The satisfactory work done by these furnaces has led to the introduction of similar apparatus of various forms and sizes, in many hospitals, and public institutions in New York City and the vicinity; among these are St. Luke's Hospital, Cornell Medical College, Lying-in-Hospital, Bellevue Hospital, Mount Sinai Hospital; the hospital for contagious diseases, Polhemus Dispensary, Consumptives' Home, and the Kings County Institutions, Brooklyn. The Hudson County,

Institutions, Snake Hill, N. J., etc. These destructors are also in use at City Hospital, Boston; Burbank Hospital, Fitchburg, Mass.; Pennsylvania Hospital, Philadelphia, and the Laboratory Marine Hospital Service, Washington, D. C.

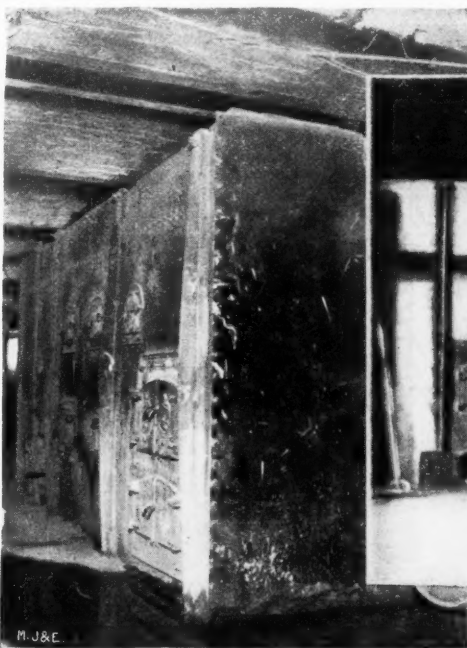
Plants are now being installed at the Sailors' Snug Harbor, New Brighton, and the Montefiore Sanitarium for Consumptives, at Bedford, N. Y.

Private individuals have availed themselves of the same methods, and installed destructor furnaces in factories, apartment houses and hotels, in addition to the installations made at the public institutions. A notable instance is the destructor in a large and expensive apartment house containing eighty families, where all the garbage is daily consumed by the combustible refuse without other fuel.

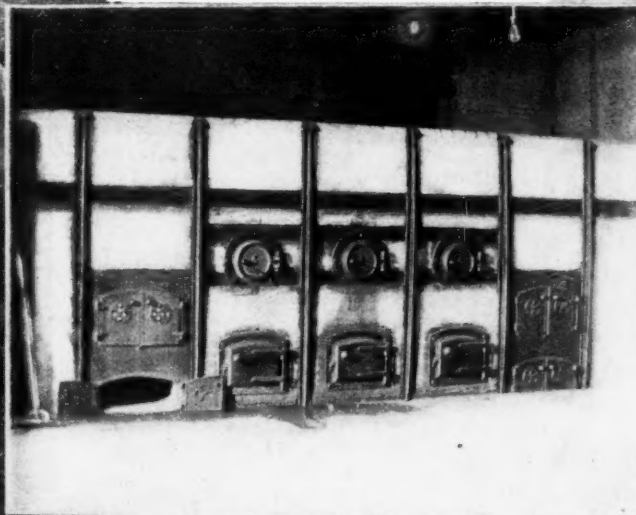
These destructors for general use are built with an exterior heavy steel case, braced and stayed by steel beams and angle irons, and are lined with solid walls of fire-clay brick blocks, made expressly for this purpose, with garbage grates of the same material. There is one main fire box furnishing the heat for combustion, and a secondary fire that provides for the combustion of all smoke and inflammable gases. The feeding holes and doors are arranged for receiving the waste, at the top, sides, or the end of the furnace, as may be most convenient. The smoke flue may connect direct with the chimney of the building, or with the breeching from the steam boilers without interference with the draft of furnace or boilers. Doors are placed for stoking the material to be destroyed and for removing the ashes.

These furnaces are of the Morse-Boulger type of destructors and are built in seven different sizes, ranging from six feet to twenty feet in length, having a proportionate capacity of one-fourth to ten tons daily of garbage, refuse, and miscellaneous matter. Special appliances are provided, when needed, for an unusual amount of liquids.

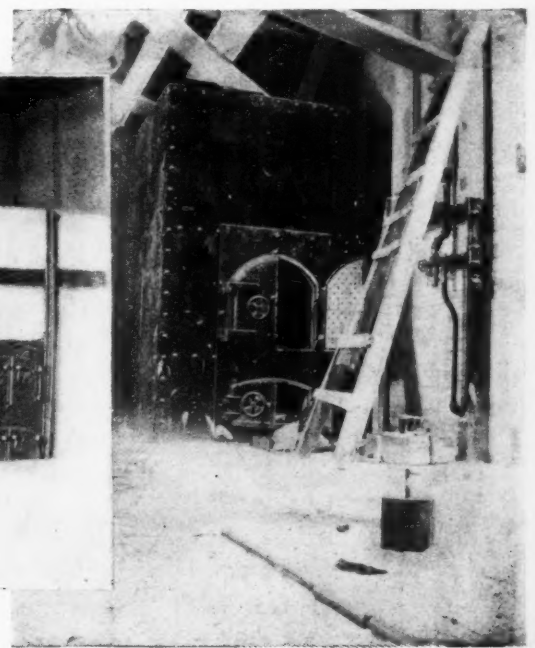
When required by a group of large public institutions, or small communities where the local population is from fifteen hundred to four thousand persons, a separate disposal station



IN NEW YORK HOSPITAL—IN USE SEVEN YEARS.



IN ST. LUKE'S HOSPITAL, NEW YORK—IN USE SIX YEARS.



LYING-IN-HOSPITAL, NEW YORK—JUST INSTALLED.

INSTITUTIONAL GARBAGE DESTRUCTORS.

is built, with covering house enclosing the furnace and provided with convenient means for delivering the waste to the destructor.

A disposal station of this class is built at the Kings County Institutions, Flatbush, Brooklyn, and the Hudson County Institutions, Jersey City.

For large hospitals, the destructor is placed in the basement and connected directly to the main chimney, as in Bellevue Hospital, or with the smoke flue from the steam plant, as in the Lying-in-Hospital, New York.

For the special purposes of medical colleges, a small compact and powerful destructor is provided with apparatus for using oil as fuel sprayed by air or steam, and developing a temperature of 2,000 degrees, destroying the most refractory material in the shortest time with a minimum of fuel and labor and with complete sanitary protection. Such a destructor is in use at Cornell University Medical College, New York City.

For bacteriological laboratories, a small destructor is enclosed in a non-conducting covering and placed on the floor of the room, connected with the chimney, and operated by gas from the city mains under air pressure, as at the Marine Hospital Laboratory, Washington, D. C.

It is difficult to give exact figures for the amount of material destroyed and the relative cost for fuel and labor because of the absence of records. Taking the largest hospitals and institutions, where the quantities of kitchen garbage is from 1,000 to 6,000 pounds per day, the coal required is about one-tenth of the weight of garbage, but when there is a considerable amount of combustible refuse the coal is greatly diminished. For instance, at Bellevue Hospital, New York, with 2,500 inmates, the garbage approximates three tons daily, and the average quantity of coal is 400 pounds, the refuse collection on many days being almost sufficient to operate the furnace. In several other instances the refuse is ample to consume the garbage after a preliminary fire of coal.

The item of labor does not come into the expense account except for isolated plants, like Kings County Institutions, as in most cases the destructors are operated by the firemen who attend to the steam boilers. When oil is employed there is a still greater efficiency, with slightly increased expense, because of cost of the oil, and the constant service of an attendant.

These destructors may be varied in design and size to conform to the room and conditions where they are to be used, and thus may be placed where other less elastic forms of furnace cannot be employed.

From personal observation extending over twelve years, during which time there has developed a form of destructor that under many varying conditions has proved itself to be reliable and efficient, there seems to be no valid reason for not accepting the experience of numerous institutions, as regards the efficacy of this method for disposal of institutional waste. The results may be thus summarized:

Cremating furnaces, or destructors, may be employed to advantage upon the premises of institutions and separated buildings of every class, where the amount of waste ranges from one-half a barrel to five or eight tons daily.

These destructors may be placed in any accessible location where connection with chimney or smoke flue from the

boiler can be made, without interference with the draught of either furnace or steam boiler. They may employ any kind of fuel most convenient, natural or artificial gas, coke, coal, oil or wood. They can be made to destroy every kind of waste that fire will consume without offensive fumes or odors during combustion.

The expense of construction and operation is proportional to the amount and nature of matter to be destroyed, and the length of time occupied by the process; the total cost being insignificant when compared with the beneficial results that uniformly attend their adoption and intelligent use.

GOOD ROADS EXPOSITION ON WHEELS.



SENATOR H. S. EARLE,
Promoter of the Good Roads Train.

THE final meeting of those in charge of the "Good Roads Train" movement will be held the first week in June to arrange for the complete itinerary of the train. As has previously been announced in *THE JOURNAL*, the train will be fitted out with all the modern road-building machinery—indeed, it will be a real "Good Roads Exposition" on wheels.

The railroads of the United States realize this to be one of their grand opportunities and, therefore, several have already offered to pass the train over their lines free of charge. The fact that good roads in the rural districts mean better and more constant feeders to the traffic on the railroads is fully appreciated by the railway managers and, it is more than likely, that the railroads throughout the United States will be glad to encourage the construction and maintenance of good country roads to the extent of passing this train over their system free.

An experiment similar to this movement contemplated by Senator Earle, of Michigan, was tried last February, the train starting from New Orleans and running north to Chicago, building several specimens of good roads at different points along the way. The good results from this short trip have already begun to be realized in the South, for the cry for good roads in other localities in the Southland is becoming persistent and emphatic.

This plan, which is pushed forward, is larger in its scope, for it contemplates a trip throughout the country. It has the hearty endorsement and promised co-operation of the Hon. Martin Dodge, director of the office of Public Road Inquiries of the United States Department of Agriculture. Other prominent state officials have already signified their willingness to lend a hand in furthering the interests of this movement, and the probability is that the farther the train goes the greater will become the enthusiasm of the people generally. It would not be a bad idea to keep the train in motion for at least a year; in the Northern States during the summer and in the Southern States in the winter.

This train will start on its journey about the last of June, spending the months of July and August in the Middle West and East. The Pere Marquette Railroad, of Michigan, and the Boston & Maine, of New England, have already offered free transportation to the train. And it has already been decided that the train will spend August in New England, as Senator Earle has accepted an invitation from the Old Home Week Committee of New Hampshire to spend the week covering from August 17th to 24th inclusive in that State. Governor Jordan, ex-Governor Rollins, of New Hampshire, J. T. Meader, of Boston, and others will accompany the train on its trip through New Hampshire.

HEALTH OFFICER WENDER, of Buffalo, says that every city health department in the United States should be a subscriber to the *MUNICIPAL JOURNAL*.

MAYORS DISCUSS MUNICIPAL OWNERSHIP.

THE ownership and operation of public utilities by municipalities is, whether for good or ill, the most talked about question concerned with city affairs. Some people call it a form of socialism. There are those who favor it and those who oppose it, who are so convinced of the correctness of their respective conclusions that they are not open to conviction, while the great majority on either side are anxious to receive new light upon the question. The majority of city officials feel sure that they are right in favoring municipal ownership, but they are not ready to say they know all that is to be learned about the matter. It is to the majority that the MUNICIPAL JOURNAL AND ENGINEER offers the use of its pages as an open forum in which to discuss this important question, with the purpose in view of not only clarifying the atmosphere but deducing some principles upon which all can agree. To this end, a few days ago, THE JOURNAL sent out letters to over 800 mayors, giving them an opportunity to express their opinions and the reasons for the same. Up to date 244 answers have been received: 135 are non-committal, 12 favor municipal ownership under certain conditions, 9 vote "no," and 88 vote "yes."

The opinion and reasons of a few, which have been selected at random from the replies received, are given below. Others will be given in future issues.

J. A. JOHNSON, FARGO, N. D., PRESIDENT OF L. A. M.

"You may quote me as being in favor of municipalities owning their own water works, gas and electric light plants, street cars, and, if possible, telephones. I believe that cities should furnish the service of these utilities to its citizens at cost. What I mean by cost includes all expenses, such as interest on bonds, provision for sinking fund, depreciation, loss of taxes, etc. In other words, I believe that the profits that go to stockholders in private companies—not only on bonds, but on stock, watered and genuine, should be saved to the citizens that support the municipal governments. If municipalities should own the public utilities above named there would be no corrupting of municipal officers and the scandals so often uncovered would be impossible.

"In order to carry the above ideas into effect, civil service would have to be inaugurated. It would be impossible for municipalities owning natural public utilities to successfully carry them out, if they were subject to the spoilsman at the change of each administration.

"From observations on a recent trip to Europe, I have become convinced that municipal ownership can be made a success. It is done in England, Scotland, Holland, Sweden, Denmark, and other countries. I am unwilling to admit that what can be done there cannot be accomplished here."

THOMAS T. HUEY, BESSEMER, ALA.

"I am heartily in favor of municipal ownership of what are called natural monopolies. I have advocated city ownership of lighting plant and water works. We will have an election soon to determine whether or not the city shall issue bonds to build and operate a lighting plant.

"My reason for this opinion is, I think we can do it much better and more cheaply than it is being done."

JOHN W. MORRIS, TROY, O.

"My answer is an unequivocal yes.

"These natural monopolies are primarily the property of the people. No corporation or combination of capital can give a sufficient or satisfactory compensation for them, for the reason that there is no standard by which to measure their value in money. They belong to the same class as natural opportunities—light, air and land—and whenever the people consent to part with their control over them they simply yield so much of natural liberty. The effect of such a condition is evident."

D. L. D. GRANGER, PROVIDENCE, R. I.

"I am in favor of the public ownership and management of such public utilities as public water supply and public lighting. I am in favor of the ownership of street railways by municipalities. Whether such railway should be operated by the city, or by private corporation, depends on conditions existing in each locality.

"I believe that the public ownership and management of public utilities by municipal corporations is desirable: First, because such ownership will do away with the attempted corrupt influence of the corporation interested upon legislative bodies.

"Second, because of the revenue which I believe would accrue.

"Third, because, in my opinion, the greater the responsibility put upon municipal government the more likely it is that citizens generally will be compelled to take an active interest in the management of civic affairs. So long as the city government affects the merchant only indirectly, the less liable is he to find time to interest himself in it; but if his water supply, his gas and electric lights and the cars which bring the customer to his door are under the management of the municipality, he cannot afford to ignore his part in the government of his city."

ORSON DURAND, PERU, IND.

"In answer to your question; yes.

"If a private corporation can operate a water plant with success, why not the city, if properly looked after? We constructed our water plant, and have operated it successfully for many years. The supply was taken from the Wabash river until it became too much polluted with oil from wells and other refuse matter. Since then we have taken it from deep driven wells. We purchased the lighting plant some months ago, which is also a good investment and source of revenue. Our city is operated under an old charter, which deprives us of many privileges accorded to other cities, but our city is booming just the same."

E. A. FRANCIS, CITY CLERK, HASTINGS, NEB.

"Yes; most decidedly.

"Past experience has demonstrated in this city that citizens are given better service at a cheaper rate. In the case of our water works, we are furnishing water to the citizens at an average cost of 9-83/100 cents per 1,000 gallons; to large consumers 7 cents.

"As to electric lights, our system is established in connection with the water works, and was put in operation on the first of the year, and so no definite figures can be given. We have sixty street arc lamps, of 2,000 candle power, burned till midnight on moonlight schedule. We have a commercial system of the equivalent of 1,420 sixteen candle power lamps, the revenue from which, in the three and a half months the plant has been running, has made the cost of our street arcs only \$1.75 per lamp per month. At no time do we expect the street arcs to cost over \$2.50 per lamp per month. Municipal ownership with us is a success."

JOHN M. PLEASANTS, PETERSBURG, VA.

"Yes; for reasons of public economy and utility."

HENRY P. SCHERER, FORT WAYNE, IND.

"Yes, in favor of municipal ownership of all public utilities."

HOMER S. CUMMINGS, STAMFORD, CONN.

"I am heartily in favor of municipal ownership of public utilities. Every city should own its own gas, electric light and water works plants."

W. A. JOHNSON, COVINGTON, KY.

"I am in favor of the municipal operation of all public utilities for the reason that they are inherently the property of all the people. If they can be operated at a profit by private individuals or corporations, the profit should be saved to the people by their obtaining the ownership, control and management of them. The people are entitled to the use and benefit of their own property at the least possible cost, and should not be subjected to the possibility of oppressive charges for the same at the hands of private companies to pay dividends upon fictitious valuations represented by watered stock."

G. R. GOULD, LAWRENCE, KAN.

"Replying to your question I answer no.

"My reasons are, that so far as my observation and knowledge has been, the city running the different plants you enumerate does not do it as economically as if run by private individuals. I think

it is a well-known fact that the municipal affairs in general are not run on very economical principles."

E. S. PARKHURST, GLOVERSVILLE, N. Y.

"I have carefully considered both sides of municipal lighting and similar propositions, and I do not think they have as yet demonstrated in this country that they are the boon their promoters would have the people believe. In fact, in a large number of cases, the cost of lighting has been in excess of what could be done by contract with a private company.

"If a municipal plant could actually be conducted upon the same business methods employed by a corporation, the results might be more favorable than at present. But, under existing conditions, I believe that disappointments are likely to be the rule and not the exception."

CLEVELAND'S FAMOUS MAYOR.

BY PROF. EDWARD W. BEMIS.



MAYOR TOM L. JOHNSON.

TOM L. JOHNSON was born in 1854 in Louisville, Ky., and forced to earn his own living from childhood. He entered the service of the Louisville street railway at the age of nineteen and became its superintendent at the age of twenty-two. Later he secured control of the Indianapolis street railways, and afterward those in Cleveland, Detroit, Brooklyn and several other places. He also developed a large steel industry in Johnstown, Pa., and at Lorain, O. He has lately said that he owed his success to securing at a low price enterprises which were thought to have but little value, and then developing them until they became very profitable. It has only been since the perfection of electric traction and the construction of large street cars that he has come to see the practicability and even profit of three-cent fares in our larger cities. He claims that such experiments as the majority of the stockholders allowed him to make in Detroit have convinced him that three-cent fares stimulate short rides, which are the most profitable, and that there is in many cities actually as much money to be made on a three-cent fare as on a five.

Ever since he chanced to buy a copy of Henry George's "Social Problems," on a railroad trip from Indianapolis to Cleveland, he has not hesitated to spend time and money to secure fairer taxation, lower rates of fare and other forms of public control of all natural monopolies, although he was thus, as a citizen, working against his private interests as an investor. He has now at the age of forty-six closed his career as a business man, at a time when he could easily double his fortune in a few years, in order to devote the rest of his life to work for the public welfare.

"Mayor Johnson is a capital speaker, without training in oratory or much scholarship of any kind," said a friend. "He wins his audience by his smiles, his fun, his seeming friendliness, his well-studied frankness in admitting what he cannot deny, and, oddly enough, by the tense and vibrant feeling of his serious moments.

"In 1890, when Tom L. Johnson was first elected to Congress, he held a joint debate with Theodore E. Burton, then, as now, the representative from the Twenty-first District of Ohio. Lawyer Burton was the older man, much better educated, more familiar with national affairs, a trained speaker, already well established in public life. Johnson had been in Cleveland only a few years as a street railroad builder and manager, eagerly engaged in amassing a fortune. Congressman Burton should have won the honors of the debate, but it was disastrous to his cause. In two minutes Tom Johnson's smiling gibes and pointed jests wiped out the effect of half an hour of able lawyer-like argument. In five minutes more a few strong sentences uttered with every sign of deep and passionate sincerity and feeling, would put the audience on his side, and the longer

the debate went on the worse it was for the better-equipped candidate."

After serving two terms in Congress, the Republicans re-districted Cleveland, which was naturally a strong Republican city, so as to secure his defeat when he ran a third time. He now says that he wonders why he ever thought that his place was not in political life, for he now believes that he can wield a greater influence for better government and better social conditions in public life, whether in or out of public office, than in any other way. He holds that to be mayor of a city like Cleveland furnishes a great opportunity to effect reforms in legislation and administration throughout than as either Senator or Governor, although I imagine the time will come when he will be willing to run for Governor of Ohio, but that time is not yet. He tells Mayor Jones and myself with great positiveness and with evident sincerity that his chief ambition at present is to make so good a Mayor for Cleveland that he will be re-elected with twice his previous majority, which was 6,000 at a time when all the rest of the ticket went Republican by 5,000 majority.

In the few weeks that have elapsed since election Mr. Johnson has been putting in night and day in trying to secure a better class of city officials and a better enforcement of existing laws relative to the assessment of real estate and steam railroads. Many have feared that he would yield to the temptation to build up a political machine and fall a victim to the spoils system, but he claims that he has displaced less subordinates than has usually been done, and is determined to make efficiency the test in appointment and retention of office, although he very frankly avows that he is not altogether oblivious to the necessity of having in the most responsible positions men who are in sympathy with his ideas. Doubtless in some of the subordinate offices will be placed political supporters, but the general character of the administration and its appointments thus far have been so much above that of any previous administration of Cleveland and so much above what is generally understood by the spoils system, that Civil Service reformers cannot have any large ground of criticism.

Cleveland needs large expenditures for improvements, paving, street cleaning, public buildings, health department, small parks in the heart of the city and other things; but, at the same time, the methods of raising revenue in the city and State are so far behind the times in comparison with Pennsylvania, Indiana and many other States, that the executive's chief thought is now naturally turning toward questions of taxation. He rightly holds that any thorough-going reform in taxation cannot occur without some change in the State constitution and in the laws, so as to permit a separation of the sources of State and local revenue. To the counties and cities might be left a large degree of local option in the taxes that they will levy upon lands, improvements and local franchises, while the State could get its revenue from the railroads, telegraphs, express and sleeping car companies and certain other corporate interests, together with the inheritance taxes.

But, to his surprise, Mayor Johnson has discovered that a large degree of improvement can be effected even under existing laws. The State constitution, for example, provides that, "Laws shall be passed, taxing by a uniform rule, real and personal property, according to its true value in money." Yet it has been the custom of the County Auditors of the various counties to assess the railroads, not according to their true value in money, which, of course, is the price at which they could be sold as judged by their net earnings and the market value of their securities and by other evidences of value, but on the basis merely of the inadequate returns which the railroads have given of their physical property treated as so many hundred acres of land, so many yards of grading, so many rails, cars, depots, etc. The auditor of each county through which the railroad passes meets with his brother auditors to assess a railroad. A dozen roads entering Cleveland have been assessed that way in the past three weeks. In no case has a road been assessed at over 20 per cent. of its true value, and some about 10 per cent., while it is admitted on all hands that farms and city real estate are assessed at from 40 to 60 per cent. of their true value. To be sure, only a small portion of personal property is reached, but what is reached is assessed at fully half its value. A railroad derives so much of its value from its road-bed and its terminals in the large cities, that it is more analogous to real estate than

to personal property, yet board after board has met in Cleveland recently, and after listening with ill-concealed impatience to undisputed facts showing the true condition of affairs and showing the ridiculousness and even falsehood of some of the returns of even the physical property of the roads, have refused to cross-examine the railroad officials or send for their books and auditors and other officials as the law permits. These auditors frankly admit that they ride on passes from the roads they are assessing and defy public opinion, saying, in effect: "What are you going to do about it?"

Without revealing the Mayor's plans, which would be unwise at this time, it may be remarked that he is proposing to do a good deal about it before he gets through, and, from the interest that is being taken in the subject by Mayor Jones, of Toledo, Mayor Hinkle of Columbus and other city officials, and by public sentiment generally throughout the State, it may be safely said that the movement now beginning is going to have large results, both in the enforcement of existing laws and in the enactment of better laws before many months passed. Ohio, and especially Cleveland, will be more interesting to the majority of Americans during the next year or two than even Detroit ever was under Mayor Pingree. The interest is even likely to equal events at Washington itself.

In closing, it is only fair to Mr. Johnson to say that he appears, to all who know him intimately, to be absolutely honest and sincere in all his work. He repeatedly emphasizes the fact that he has no quarrel to pick with the men who, without corruption, are profiting from the laws which the people make or permit to be made, but he seeks simply for justice for all and asks the rich, without giving up the fortunes which they have already made, to act henceforth as patriotic citizens as well as makers of money; in other words, to be public spirited and, so far as they are able, to exert an influence for the public weal.

HAMILTON'S BAD RESULTS WITH TAR MACADAM.

BY FRED J. WARREN.

A RECENT visit to Ontario, at which time I took occasion to examine the tar macadam in Hamilton, brought out some conditions which could have been anticipated from seeing a report of the methods employed. From a road builder's standpoint the results in Hamilton from the use of tar in the macadam roads could not be considered satisfactory. The roads built twenty years ago, under conditions which are not carefully recorded, are unquestionably in better condition than those laid last year.

In considering the life of a pavement due weight should be given to the class and amount of traffic it sustains. The traffic on the Hamilton streets is very light as compared with that on the streets of hundreds of cities in the United States. It is a well-understood fact that the lighter the traffic the longer is the life of the pavement. For this reason the Hamilton pavements should be long-lived, but the accompanying photographs show the conditions of the old pavements and the defects in some of the new ones. These defects are due to a combination of bad methods of construction.

First, from the mixing of the bituminous material with the mineral matter in improper proportions.

Second, from the improper selection of the mineral grain, or the use of a mineral grain of too uniform a size, whereby too large a percentage of voids was developed.

Third, the improper selection or preparation of the bituminous cement from the crude bitumen used, making a cement of the wrong consistency to properly bind the mineral matter together.

It should be understood that the wear of any concrete wearing surface is borne by the stone or mineral grain; the cement being used to bind the mineral grain together, and does not receive the wear itself. In order to stand the most wear, the mineral grain should be so graded by using various sizes, as to produce the least possible amount of voids. Any even-sized material will develop from 40 to 50 per cent. of voids. If the mineral grain selected is crushed stone two inches in diameter, and without increasing the bulk approximately the largest amount of each receding size is added, there would be added to two-inch stone from 30 to 35 per cent. by weight of various sizes down to an impalpable powder. This fine material is not in the Hamilton work. It is impossible to reduce the voids below 9 to 10 per cent., using stone no larger than two inches in diameter. Such a mixture of stone will develop, when compressed, the best possible wearing surface for the macadam road, and when each grain is surfaced with bitumen the latter will approximately fill all voids and thoroughly bind the particles together, leaving an absolutely impervious and waterproof surface, and the bituminous material will be closely confined in the concrete so that the air and water cannot get to its minute particles. Its longest life is only thus attained.

If the bituminous material is carefully selected the life of such a wearing surface under heavy traffic is equal to the wear each mineral grain will sustain before being ground away. The mineral is not subject to displacement under traffic, as the mixture is so dense that there is no place for it to move to, and the traffic is never heavy enough to dislocate the wearing surface. On streets with light traffic the measure of the life of the wearing surface properly constructed on a solid base is equal to the life of the bitumen. And the properly selected tar bitumen confined as above, has been proven to have a life of from thirty to forty years.

In Hamilton it is quite evident that the tar was not properly prepared, and the mixture was such that in many cases the air penetrated the mixture which has done more to deteriorate it in one year than should have occurred in twenty years under proper methods.

While the tar was not of the best grade, I may say that if it had been properly used, better work would have resulted than was secured last year, as the method in Hamilton of laying macadam in several courses of decreasing but of even size and depending upon a steam roller or traffic to bind them together is not a correct practice. In some cases the sizes are mixed and in some cases they are not, and the result must necessarily be more or less inequality of wearing surface, and in many cases absolute failures.

Were the Hamilton pavements laid last year subjected at this time to ordinary heavy traffic, many of them would be entirely worthless after a few days' usage. Hamilton has not carefully considered the experience gained by over one hundred and fifty cities in the use and abuse of bituminous materials for more than thirty years, and has



LAID IN 1900.

LAID IN 1899.

LAID IN 1900.

HAMILTON TAR MACADAM PAVEMENTS.



HAMILTON TAR MACADAM—LAID IN 1880.

fallen into many of the errors which were made in various communities of this country during the early stages of the business. Other cities are making similar errors now. The problems which should be considered by an expert before work of any magnitude should proceed, and on which the wear of the pavement depends, may be partially enumerated, as follows:

First, on the selection of mineral grain after considering—(a) hardness; (b) microscopic view; (c) voids; (d) surface area of grain to be coated; (e) shape of grain; (f) cleanness of grain.

Second, selection of bitumen considering—(a) waterproof qualities; (b) amount of volatile oils; (c) effect of elements by decomposition; (d) range of flexibility; (e) effect of cold weather; (f) effect of hot weather; (g) adhesiveness; (h) ductility; (i) ageing effect by exposure.

Third, softness of bituminous cement considering—(a) quality, size, voids and area of grain to be coated; (b) nature of bitumen being used; (c) conditions of traffic, exposure, kind of foundation, probable use, abuse, etc.

Fourth, percentage of bitumen to be used considering—(a) size, quality, absorbent or non-absorbent nature of grain, surface area of grain to be coated, voids in grain; (b) amount of non-bituminous matter in the cement, conditions of traffic, etc.

Fifth, as to the method the following points are of relatively great importance—(a) quick compression while hot; (b) foundation and sub-foundation can be of any good material well compacted, and should furnish drainage; (c) care and skill in spreading and laying; (d) the largest amount of compression should be given.

The following facts should receive careful consideration:

The combinations possible present new conditions in every individual case. A fixed specification is impracticable.

The success depends upon the honesty and range of experience which the supervisor has.



HAMILTON TAR MACADAM—LAID IN 1893, RESURFACED IN 1900.

Previous experience or information, with laboratory records, is essential to passing judgment on the practicability and adoption of any given formula or specification in the doing of any kind of bituminous concrete work.

Bituminous macadam is not in any sense an experiment, as every principle involved has been proven for years and it is the logical development of experience.

It becomes an experiment in the hands of inexperienced supervisors.

Until city authorities realize that the building of bituminous concrete pavements of any class requires a large range of experience and act only upon expert advice they will find a large per cent. of their work very defective or worthless. This applies to asphalt as well as to other forms of bituminous work.

The amount wasted by the use of improper bitumens and the abuse of good bitumens in this country involves many millions of dollars.



HAMILTON TAR MACADAM—LAID IN 1883.

THE TESTING OF PORTLAND CEMENT.

BY WALTER E. BUSH, C. E.*

BEFORE dealing with the methods of testing Portland cement, it will be as well to briefly refer to its chemical composition. This varies considerably. Mr. Butler gives the proportion of its constituents as roughly: Lime, 60 to 64 per cent.; silica, 20 to 24 per cent.; alumin, 6 to 10 per cent.; iron oxide, 3 to 5 per cent., with about 4 per cent. consisting of small quantities of sulphuric anhydride, magnesia, alkalies, etc.

The great point to be observed is—that these constituents must be in proper chemical combination in the form of silicates and aluminates of lime, which will, on the addition of water, become "hydrated" compounds, capable of setting by the process of crystallization.

The first chemical combination is brought about in the kiln by the process of calcination, and depends for its success on the intimate mechanical mixture of the raw material forming the slurry being subjected to the action of a fierce heat to a point just short of fusion, but as to the exact changes that take place and the compounds that are formed in the clinker, though many theories have been advanced, precise knowledge is wanting, and this is equally true as regards the action of setting. In the meantime the user may judge how far the Portland cement will answer his purpose as a constructive material by putting it to various tests to ascertain the following qualities:

(1) Soundness; (2) Fineness of grinding; (3) Tensile, and in some cases compressed strength; (4) Setting properties; (5) Weight or specific gravity. To these may be added examination under a microscope and chemical analysis.

(1) In testing for soundness, by which term is signified its freedom from "blowing," which again is the expansion caused by the hydration of free lime in the cement, indicating overlining or underburning, the ordinary method employed is to gauge up pats of

* With the City Engineer's Department, Birmingham, Eng.

cement about three inches in diameter and one-half inch thick, having tapering edges, on a piece of glass, placing some in water, the rest in air, but protected from the sun's rays, and then examining the pats from time to time to see if they show signs of cracking or crumbling at the edges.

Mr. Butler advocates the "Faija" test, which consists in gauging similar pats to those mentioned above, and exposing them for six or seven hours to a moist heat of 100 degrees to 105 degrees Fahr., until thoroughly set, then immersing them in warm water of 105 degrees to 120 degrees Fahr. for the remainder of the twenty-four hours. This is supposed to artificially age the pats, and, after a long experience of this method, Mr. Butler says: "If a pat treated . . . at the prescribed temperature shows no sign of cracking or blowing at the end of twenty-four hours, and adheres firmly to the glass plate . . . the cement may be used with perfect confidence; it will never blow."

Another method which the writer has used, and which is advocated by Mr. Humphreys in his pamphlet on "Cement Testing," is "to fill a small glass chemical retort with fairly fluid cement, and if in setting it does not either crack the flask or shrink away from the sides it may be taken as sound."

(2) Testing for fineness of grinding simply entails sifting a known weight of the cement through sieves of various degrees of fineness, weighing the residue in each case, and seeing what percentage it bears to the whole. Care must be taken, however, not to sift too vigorously, or the process of sifting will reduce the real residue by attrition and produce an unduly favorable result.

(3) In testing to ascertain the tensile strength of Portland cement there are several points to be considered, such as the size, shape and method of mixing the briquettes, their treatment before being broken, the machine for applying and the rate of application of the load. The usual form of briquette mould allows for an area of one square inch at point of fracture, but there is much force in the contention for a two and one-quarter inch briquette that "the larger section reduces the liability to errors and false deductions." A very convenient form of mould is the best arrangement of the late Mr. Faija, which gives five one-inch briquettes of a very good shape.

The sample to be tested should be obtained from a number of bags or bins, and mixed together. The outside layers in bag or bin should be avoided in the selection. A certain quantity should be weighed out, placed on a slate slab or in an iron mixing-tray, and a pond formed in the center, in which the water, about 20 per cent. (by weight) of the cement, should be gently poured. A small trowel should now be taken in each hand and the cement vigorously gauged to a stiff paste, which is then put in the moulds, well pressed home by the thumbs, and the top smoothed off with the trowel. If the thumb-screw single moulds are used they should be laid on a plate of glass before being filled, and kept tightly pressed on it during the operation. The moulds must be left on the plate in a shaded position for twenty-four hours, when the briquettes are taken out and placed in water for a period of six, thirteen or twenty-seven days, as may be desired. Both the temperature of the air and water in which the briquettes stand should be about 60 degrees Fahr.

It would be invidious to pick out any particular make of testing machine for special mention. There are a variety on the market, and in choosing one the following points should be observed: (a) Simplicity of design and construction; (b) Adjustable holding clips, provided with a clamping arrangement to enable the briquettes to be accurately placed in them; (c) Automatic feed or method of evenly applying load.

The briquettes must be very carefully placed in the jaws of the clips and securely clamped, so that the strain may act evenly on the whole cross-section. Mr. Butler recommends the application of the load at the rate of 100 pounds in fifteen seconds, while in the testing-room of the Birmingham Corporation 100 pounds is applied in one minute.

The average breaking strain of not less than three briquettes should be taken and entered with other particulars in a book kept for the purpose.

There are various machines designed to ascertain the resistance

of cubes of cement to compression and shearing, but it is not a test that is usually specified.

The writer has a high opinion of the value of the sand test, and suggests that briquettes made from mortar composed of the cement and sand to be used on particular works should be tested and compared with briquettes of mortar gauged at the same time and of similar proportions of the cement and Leighton Buzzard (standard) sand, which is washed and sifted to pass through a "20" mesh sieve and must remain on a "30" mesh sieve.

(4) The "Vicit" needle is generally used for ascertaining the settling properties of cement. The writer has used this apparatus, but does not consider it any great improvement on the simple method of subjecting a pat to the pressure of the thumb-nail to ascertain when it is "set hard," and thinks that close observation of the behavior of the cement during the period of testing for soundness and strength, with the results thereby attained, will enable this test to be dispensed with.

(5) The weight of cement is generally required to be above a certain number of pounds per struck bushel. Now, it is at once apparent that a bushel of a material like cement weighs heavy or light, in proportion as it is densely or lightly packed, so that this clause in a specification is of little use, and in place thereof a certain gravity should be specified. This may be ascertained with a Keate's, or some other form of specific gravity apparatus, and a chemical balance, in the usual manner.

Observation of cement, and particularly the residue left in the sieves, under a microscope is very valuable in detecting adulteration in the shape of slag, Kentish rag, or other foreign substance, samples of which should be kept on hand and examined alongside the cement.

Chemical analysis in combination with the physical tests enumerated above is very useful in determining the behavior of the cement under certain conditions, but it requires to be most carefully and accurately conducted. Mr. Redgrave, in his book on "Calcareous Cements," gives very full instructions as to the methods to be followed.

The writer believes that great improvements can yet be effected in the process of calcination, and would suggest that, as a means to that end, careful observations should be taken of the temperature during burning by means of a pyrometer, to determine what degree of heat produces the best cement.

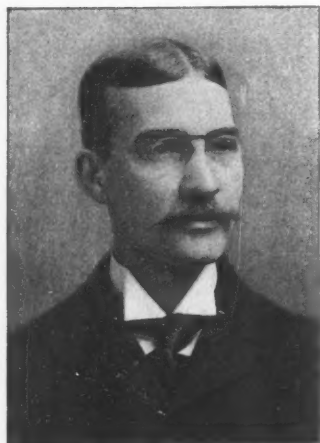
As regards the degree of fineness of grinding, tensile strength, specific gravity, and other qualities specified as necessary in Portland cement, the writer will not add his to the various and (in some cases) conflicting opinions already advanced, but would suggest that, it being now full time that a standard specification for Portland cement were adopted throughout the British Isles, representatives of the manufacturers be invited to meet delegates from the various associations and public bodies whose members and officials are interested in its use, to see if an agreement can be reached as regards the terms of and methods to be employed in testing the cement supplied under such specification, and to consider the advisability of establishing stations in the larger cities where cement may be tested in an uniform manner at a fixed scale of fees.

The writer has never had any case of failure with Portland cement brought directly under his notice, beyond that of cement rendering flaking through the action of frost; and he is of opinion, after careful examination of all classes of sewerage work, that good Portland cement, after it has once set, is not specially affected by the action of sewage.

NO GOSSIPING WILL BE ALLOWED in Homestead, Pa., as Burgess J. Clyde Miller has so decreed. It applies particularly to women who stop to gossip on the streets after they have done their trading on Saturday nights. The order will be strictly enforced, even though it seems ridiculous, for Burgess Miller has ruled his town with a high hand ever since his elevation to the burgess' chair last February, and not without good results. He has run the slot machines out of town, stopped merchants from sweeping dirt and refuse into the streets, and handled the tramp question with a vigor that makes the knight of the road shun the town of Homestead.

A YEAR'S MUNICIPAL ACTIVITIES.*

BY CLINTON ROGERS WOODRUFF.



CLINTON ROGERS WOODRUFF.

THERE has been no more encouraging feature of our public life than the growing appreciation of the importance of the municipal problem. It was not until the opening of the last decade of the nineteenth century that the people began to appreciate the fact that there really was such a problem. Cities had been mainly engaged in increasing their population, boundaries and material resources. They had scarcely given a thought to the broader and deeper question of municipal life. If a city could report more inhabitants, additional territory annexed and the location of a dozen or more new industrial plants

within its limits, it rested content with a feeling of having fulfilled its whole duty.

Members of the National Municipal League fully appreciated how conditions have changed; how public interest has expanded; how efforts at improvement have multiplied and how the study of the problem in all its phases has grown and with what salutary effect in many quarters.

At the Philadelphia Conference for Good City Government, out of which the National Municipal League grew, there were two general principles laid down as of first importance and without which it was maintained it is impossible to secure a full measure of good municipal government. The first was that "the highest principles of municipal self government in the United States are materially promoted by the absolute separation of municipal politics from national and state politics." The second was a natural corollary of the first,—that "municipal issues must be determined from a municipal standpoint." The experiences of seven years have demonstrated the soundness of these principles and have seen their more general application to actual existing conditions than was then thought possible.

The work of the Municipal Voters' League of Chicago affords an admirable illustration of the recognition of these principles. In 1896, fifty-eight of the sixty-eight members of the Chicago Council were organized into a corrupt "gang for public and corporate plunder." This represented the consummation of a long course of development which had been marked by open and shameless corruption. Within a single year it had granted "to public service corporations and black-mailing syndicates, composed in part of its own members, six great franchises of untold value, in shameless disregard of the public protest and the Mayor's veto." A Municipal Voters' League was formed to secure the election of aggressively honest men to council, regardless of their partisan views; in short, men who placed public interest and welfare before party affiliation or considerations.

This League has participated in six campaigns. In its first, twenty candidates having its approval (two of them Independents), were elected. Fifteen fully justified this confidence. In 1896 the League's recommendations were followed in twenty-five wards; and in five it was unsuccessful; in 1897, it was successful in twenty-three wards and unsuccessful in thirteen; in 1898, it succeeded in twenty-three and failed in eight; in 1899, the League's recommendations were followed in twenty-five wards, and while the Democratic candidate for Mayor carried nearly every ward; in seventeen wherein he had majorities, Republican councilmanic candidates, endorsed by the League, were elected. In 1900 and 1901 the League's endorsements were followed in about the same proportion and the "gang of 1895 is no more." To quote from a well informed authority, "Four only of its members, now a hopeless minority, linger on the scene of their former exploits, to mourn the good old days when "aldermanic business was good." The feeble band of faithful members of five years

ago became a minority of one-third, enough to sustain the Mayor's veto, after the first campaign of the League; two years later it became a majority, and in 1899 it rose to two-thirds of the council and organized its committees on a non-partisan basis. These results are due to a disregard of party names by voters.

The experience of Providence, R. I., is equally convincing. At the November, 1900, election, for the sixth consecutive time the voters ignored party considerations in local matters and selected a representative non-partisan for Mayor. The city went Republican for President and elected D. J. D. Granger, the Good Government and Democratic candidate for Mayor, the voting being:

For President.		For Mayor.	
McKinley	12,592	Granger	11,369
Bryan	7,287	Goff	9,598
Wooley	410	Hendrick	810
Maloney	740	Perkins	223

That Providence should cast 971 votes more for the mayoralty candidates than for presidential electors and display such careful, discriminating and intelligent disregard of party lines and especially at an election when the tendency is to stand by the party nominees, whether good or bad, speaks well for the state of its public opinion and for the solidity of the public sentiment in favor of the divorce of municipal affairs from state and national politics. Moreover, it is eloquent evidence of the efficiency of the genuine Australian ballot system, which prevails there, as an adequate instrument for the expression of the people's will.

Providence is not the only New England city, however, to cast aside party lines in local elections. Springfield, Mass., has an equally honorable record, which it amply sustained last November. Boston is a Democratic city, with a Republican Mayor; Worcester, Mass., is a Republican city with a Democratic Mayor, and Newport, R. I., although strongly Republican in national politics, has elected Democratic Mayors for five years past. Democratic New Haven elected a Republican Mayor this spring. The municipal government of Biddeford, Me., is and has been for several years on a non-partisan basis, the Citizens' ticket having been chosen for several successive elections to the manifest advantage of the city's revenues, tax rate and improvements. Its neighboring cities of Saco, Old Orchard and Waterboro have followed its footsteps, electing "citizens'" tickets, made up of candidates pledged to regard local interests as of first and exclusive importance.

In the Central West the tendency to break away from party lines is equally marked and is steadily increasing. Mayor Jones, of Toledo, has twice been re-elected on a non-partisan platform. Mayor Johnson was elected in the Republican city of Cleveland on a platform which confined itself solely to municipal issues at an election when the rest of the Republican ticket was elected by substantial majorities.

Citizens' tickets won at the spring elections in Washington, Perry and Centerville, Iowa, and in numerous other small towns throughout the West. Indeed, the smaller communities seem to be readier to cast aside party considerations in local elections than their larger sisters, although the tendency in these to decide elections from the point of view of municipal issues is growing with great rapidity. The experience of Chicago, St. Louis, Cleveland and San Francisco may be cited in corroboration. The municipal elections in each of these cities were decided upon municipal issues. Mayor Harrison was re-elected because of his attitude on the question of municipal franchises. In St. Louis, Mayor Wells was elected because of his pre-eminent fitness and high character against a Republican candidate who represented the dominant political organization and in face of a serious split in his own party. Mayor Johnson, of Cleveland, owes his election to his stand in favor of a 3-cent fare, and Mayor Phelan's record was such that the people of San Francisco were willing to entrust to him the inauguration of the new system provided for in the new charter, notwithstanding his national political affiliations.

Even conservative Philadelphia is making substantial progress towards ignoring of party lines. At the last November election, notwithstanding the strongly partisan character of its voters, and the fact that it was presidential year, a Republican majority of 115,487 for President was reduced to 47,130 for City Treasurer. The Chair-

* Abstract of a review of the municipal field for the past twelve months before the National Municipal League, Rochester, N. Y., May 8-11, 1901.

man of the Municipal League Campaign Committee said with much force at the conclusion of the campaign: "It was well said after the defeat of the Continental army at Bunker Hill, 'The British can't stand many such victories as this.'"

The demand for municipal rule is steadily growing in favor and force. Primarily, it, too, must depend upon constitutional changes, although some progress may be made through legislative enactment. This, however, must be an unsatisfactory method because it is always possible for the legislature to undo what it has done, and use its authority to interfere in matters with which it has no legitimate concern. The constitutional power of the cities of Minnesota and California to frame and adopt their charters is of great importance. It establishes them firmly upon a home rule basis and gives them an ample and adequate opportunity to work out their own salvation in marked contrast to the cities of New York and Pennsylvania, which are constantly at the mercy of the State Legislature.

The vicissitudes of New York under its several charters is a familiar story. The residents of the city have little say as to the form or contents of their frame of government and the legislature, a larger percentage of whose members live without the limits of the city, determine questions of vital importance to millions of people, without due consideration and often at the dictation of a party caucus or boss. The recent revision, which it is true has some excellent features, was, on the whole, so faultily drafted in many respects that the legislature was compelled to pass at the same session a number of remedial bills.

It has remained for Pennsylvania, however, to go to the full extreme in the matter of state legislative interference with local affairs at the dictation of factional politics. The present session of the legislature passed a new charter bill for cities of the second class, (Pittsburg, Allegheny and Scranton), which not only legislated out of office the present officials, who were duly elected by the suffrages of the people, but gave to the Governor the power of appointing other officials in their stead to hold office, not until their successors are elected next autumn, but until 1903! If this is not depriving these cities of their rights and powers of local self government it will be difficult hereafter to determine what does. It is almost needless to add that this usurpation of power has been questioned and that the Supreme Court has been called upon to determine whether Pennsylvania cities have any rights which the legislature is bound to respect.

Notwithstanding the setback in these states and in those places where state constabularies are proposed, the home rule cause is going forward, and during the past year has won some notable victories.

An effort to subject the city government of Portland, Ore., to the necessities of the state machine and legislature fortunately failed. A bill was passed by the recent legislature appointing a non-partisan commission of citizens of Portland to draft a new city charter. It was the first recognition in Oregon of the right of a city to draft its own organic law. Shortly after this action, and in direct contradiction of it, the Legislature passed a charter of its own for Portland, and it was only through the interposition of the Governor's veto that the effect of the original bill was preserved; otherwise the city would have been subjected to an instrument that represented only the exigencies and demands of the dominant political faction.

Chattanooga, Tenn., has also won a home rule victory. No city for twenty years has suffered more from legislative interference, accomplished, as usual, by interested politicians. The city was practically governed from the state capitol. The reformers of the city have been making steady war against this condition of affairs, and at last they have been successful.

The movement for charter revision proceeds. It represents the effort of communities to adjust their governmental machinery to new conditions. There has been marked improvement along all lines of activity except the governmental and a realization of this has led to a demand for charter reform. To enumerate the various attempts of the year is out of the question; it would include a roll call of the states and of the leading cities. This is a healthy sign; one, the importance of which must not be underestimated. That the people of our municipalities are discontented with their present municipal conditions indicates that they have changed their standards for the better.

Special mention, however, must be made of Wisconsin, which bids fair to assume a position of leadership in intelligent charter legislation, judging from the bills now pending and actively supported by the League of Wisconsin municipalities and the Milwaukee Municipal Association. One provides for the biennial election of Mayors, Treasurers and comptrollers in second, third and fourth class cities and lodges in the Mayor, subject to confirmation by two-thirds of the Common Council, the appointment of all other officers, except Aldermen, members of the School Board and of the Police and Fire Departments. Another, relating only to cities of the first class, makes the Mayor the chief executive officer of the city, and gives him the power to appoint all municipal administrative officers now elected by the people, except the Comptroller, who is to be appointed by the commissioners of the public debt. All such officers so appointed shall hold office without fixed terms, and their appointment does not require the sanction, consent or approval of the Common Council. The Mayor has the right, without a vote, to participate in the proceedings of the council or of any administrative board. He is subject to removal on charges by the Governor, and has conferred upon him every executive duty, power or authority now conferred on the Common Council. This measure is modeled on the lines of the National Municipal League's Program. A third bill, also relating to cities of the first class, establishes a Common Council composed of one Alderman from each ward, twelve elected at large, each with a four years' term, the Mayor having power to fill temporary vacancies. This bill was proposed by the Municipal Association of Milwaukee, and is likewise based on the suggestions of the Municipal Program. These measures represent a long step forward toward a concentration of administrative authority in the hands of a responsible officer and a partial obliteration of the arbitrary ward lines which have given rise to so much pernicious log-rolling and bad legislation.

That their introduction follows the Milwaukee meeting of the National Municipal League in September, 1900, at which all the principles involved were carefully discussed, constitutes a telling evidence of the direct influence of such meetings upon public opinion.

The League of California Municipalities has an equally creditable record. Ten important bills and a constitutional amendment pertaining to various greatly needed changes in the laws relating to municipalities were at its instance prepared, urged, and, with a single exception, enacted into laws at the recent session of the California legislature. These bills dealt with the establishment of public libraries, assessments for public improvements, bonded indebtedness and franchises and like subjects. Certain other legislation regarded as improper and improvident is to be attacked on constitutional grounds. When city officials unite with public spirited citizens to promote good and oppose bad legislation and to forward public improvements, we have a condition of affairs fraught with large possibilities.

So far as the establishment of the merit system in cities is concerned, there has been no change in the system in New York and Massachusetts, where the civil service reform law applies to all cities. Elsewhere the principal change in the situation has been in Chicago, where the commission, which had been very unsatisfactory for some time, was reorganized eight or nine months ago, by the appointment of Colonel John W. Ela, at one time president of the local Civil Reform Association. He has since been elected chairman of the commission, and has been doing excellent work in revising the examination system, and the system of promotions in the Police Department. Various vexed questions have been recently tested in the courts, the most important ones being recently settled in favor of the law in a case.

In San Francisco, where civil service rules were embodied in the new charter, there have been some reverses. The city and county boundaries are coterminous. Their governments are virtually the same, and the charter provided that the rules should apply to city and county offices alike. The point, however, was made that under the constitution they could not be applied to the latter. This contention has been fought from court to court, and finally decided against the advocates of the law. About five county departments are taken out from under its operation with upwards of one thousand employees. The city departments are not touched; but a bill has

been passed by the legislature which provides indirectly for a virtual repeal of the law.

The application of this law is being contested, but if it is upheld it will mean that appointments may be made in violation of the law as often as the department's officer wishes without fear of the person so selected being subsequently disturbed. The matter has stirred up not a little excitement in San Francisco, and it has been interesting to note that among those who have most vigorously supported the reform are the labor organizations.

In New York the Civil Service Reform Association has continued to keep up an active supervision of the operation of the local rule under Tammany, and has secured a considerable degree of observance in some departments. Wherever appointing officers can beat the law through the adoption of means of evasion they do so. Quite a number of these have been discovered by the association, and checked by amendments to the rules made at its instance. In some cases, however, it is very difficult to get at the truth in such a way that correction can be made, and so that persons improperly appointed may be ousted. On a conservative estimate the association has saved about a third of the ground, which in view of the tremendous advantage that Tammany has in the mere possession of both the offices and the civil service machinery is encouraging. Just at present the association is attacking the promotion of nineteen captains, made by the Police Board in December. It is commonly understood that such promotions are secured either through political influence or by direct purchase. This is a link of no small consequence in the system of police extortion and protection of vice. At the association's request the State Commission, which has all the powers of investigation of a committee of the legislature, has held three sessions, subpoenaing and examining a number of witnesses. It has already been proved that the promotions in question were made without compliance with the rules and that the Police Commissioners, who controlled three-fourths the percentage in marking, arbitrarily rated those men whom they wished to appoint in such a manner that they would come out in the desired order of appointment on the eligible list. While the matter is not yet closed, it is hoped to defeat these promotions. If successful it will be one of the most important things thus far accomplished by the association. The whole incident has gone to show to the public most clearly the results in misgovernment that are made possible through violations of the civil service law, and, on the other hand, the practical value of the law when honestly enforced, as a means of preventing such practices.

There are many other phases of the municipal problem which deserve attention, but which can only be mentioned briefly in this connection. The question of the official protection of vice and immorality is of itself sufficient to consume all the time and space at our disposal. That there is such protection in our larger cities is now a generally accepted fact. The question pressing for solution is: How shall the partnership generally believed to exist between the municipal authorities on one hand and the forces of evil on the other be effectually broken up? The New York Committee of Fifteen is giving its attention to this problem, and in its preliminary report has touched upon some of its more important features. One of its recommendations is deserving of immediate consideration upon the part of all interested in the causes of better government. It is this: "The necessity of providing suitable places of meeting where the people in each neighborhood can come together and discuss the evils that affect their civil life; where they may from time to time meet their representatives with a view of obtaining from them an account of their stewardship, and where remedies may be proposed and discussed. The committee has, in the course of its labors, been deeply impressed with the practical helplessness of the mass of the people in any attempt to secure their rights, owing to the lack of one of the elementary provisions requisite for the assertion of such right, namely, convenient and suitable places for halls of assembly. A hall of assembly is an indispensable organ of a democracy. What the town hall is in the New England village, that assembly halls should be in the modern city. The committee recommends, therefore, most heartily that in each assembly district one suitable assembly hall shall be built which shall be kept available for the meetings of citizens.

Whether this shall be done in connection with new public libraries, which are likely to be erected in every part of Greater New York, or separately from these, may be left for future consideration."

These are words of profound import and deserving of thoughtful consideration. Too little of the time and attention of the average voter is given to a discussion of local questions, and there is no opportunity for him to do so even if he so desired. Furthermore, the training of our children is inadequate along these lines, although signs of an awakening in this direction are at hand. Organizations like the Patriotic League, the Gill School City, the George Junior Republic, the Good Government Club of Syracuse, are furnishing much needed instruction in the fundamentals of citizenship. It is most gratifying that the various publications of the first mentioned, like the "Young Citizen," the "Citizens' Catechism," the "American Patriot," "Talks on Citizenship," "City Problems" and the "Life of Colonel Waring" are having an extended sale. The work of bodies like the Municipal League of Philadelphia in neighboring colleges is also a hopeful sign in the same direction.

There has been no cessation in the demand for electoral and ballot reforms. Success has crowned the efforts of reformers in some places; in others selfish partisan interest and corporate influences have blocked the way toward directness in voting at both the general and primary elections and toward an elimination of all partisan advantages and equalities on the official ballot. In Pennsylvania the personal registration constitutional amendment has been finally passed by the legislature and will be submitted to a vote of the people next autumn. The ballot reform bill, however, has been defeated. The Australian system has been established in Maryland. In Minnesota the primary reform bill of a year ago has been extended in its operation to cover all the cities. The Pennsylvania House of Representatives passed a primary election bill, but its defeat in the Senate is foreshadowed. In Wisconsin the Senate has openly and defiantly repudiated the Republican pledges for primary reform. There has been a similar failure in Michigan. In Chicago a movement has been inaugurated to introduce the Australian system in local elections.

Of necessity but a portion of the numerous municipal happenings of the year have been mentioned. Those which have been illustrate the character and extent of the progress accomplished, and furnish us with substantial grounds for encouragement. The work before us is of great extent and fraught with many difficulties, but the experience of the past decade has been such as to justify reasonable hopes as to the future.

BUILDING OPERATIONS IN MONTREAL.

It is one thing to have a law and another thing to see that it is impartially enforced. There is no department in the municipal government where the law is more likely to be enforced in a lax manner than in the building inspector's department. It often happens that when a new inspector is appointed, after a long regime under one administration, that the affairs of the department take a boom the like of which had hitherto been unknown. Such has been the case in the Building Inspector's Department of Montreal, Canada.

Alcide Chausse took charge of this department at the beginning of the fiscal year in 1900. The new ideas, methods, etc., which have been incorporated in the new administration have already yielded fruits that should please the taxpayers and citizens generally.

In 1890 there were 937 permits granted by the Building Inspector's Department, the value of the buildings aggregating \$3,308,606. The income from the permits amounted to \$297. In 1900, under the first year of Mr. Chausse's administration, there were 432 permits granted, the value of the buildings aggregated \$2,670,903, and the income of the department was \$1,051.

The fees charged for the ordinary permits are as follows:

For each shed not exceeding 256 square feet in area, \$1.

For each building costing \$2,000 or less, \$2; 50 cents additional for every \$1,000, or fraction thereof, in excess of \$2,000.

For repairs amounting to \$1,000, or less, \$1; 50 cents additional for every \$1,000, or fraction thereof, in excess of \$1,000.

There are general and specific regulations to fit every case which may arise in connection with the construction of buildings anywhere within the jurisdiction of Superintendent Chausse.

THE MUNICIPAL ACCOUNTS OF CHICAGO.*

BY CHARLES WALDO HASKINS, C. P. A.

MUNICIPAL history has not been able, as yet, to trace the origin of municipal accounting. Accounting records, on the other hand, are a principal source of municipal history. When we have exhausted our chronology of civic life, we are still in a civic world of indefinite antiquity, but of very definite accounting methods covering adequate systems of financial administration. Ur of the Chaldees and her daughter cities, buried in their own debris and silent as to their beginnings and the establishment of primitive urban organization, are sending out from their desert tombs innumerable records, inscribed on burnt clay and dated in such and such years of unknown kings, of municipal debit and credit startlingly modern in every material aspect. Away off eastward of Mesopotamia, the Chinese know more about their old counting frame than they do of their traditional first horde of wanderers in the forests of Shan-se—"homeless, naked, cold, eating raw meats and roots and insects." And across the wide waste of the Pacific the knotted strings of the Peruvians recorded municipal revenue much more reliably than municipal history. Westward of Babylon a brighter star would seem to have taken its way. Xenophon tells us that Croesus, in surrendering his immense riches, gave Cyrus an exact account in writing of the whole, containing the particulars with which each wagon was loaded, and that they were delivered thus at the palace in Babylon. Even the poor perishable Papyrus can tell us more of Egyptian accounting than the pyramids can of Egyptian origin. Wax tablets are coming down from the ages to assist us in reconstructing the financial routine of classic municipal administration. And the split sticks and other paraphernalia of the old English exchequer take us back to the very folks of the road in our research into our own ancestral financial history; beyond which we know not whether to turn to the Briton, the Saxon, or the Norman.

With all this, remembering that many of the oldest existing records are the accounting records of ancestral cities of long gone civilizations, it may seem incredible that we know so little of early American accountancy. The perishability of paper, and the little interest taken until recently in municipal study, will partly account for our present want of historical knowledge of American municipal accounting; while the extreme simplicity of pioneer life, and the great fire of 1871, will further explain the absence of early municipal records of Chicago. The corporation records were at first kept, for want of books, on loose pieces of paper. The city's account books that had accumulated to October, 1871, were destroyed in the great fire by which the municipality lost two and a half millions of dollars. Many county account books of interest to the city have disappeared in other ways; special assessment collection cash books, for instance, having been quadrennially destroyed. Neither county nor City Treasurer has any ante-fire records. The city Comptroller's accounting records were all destroyed in the fire; and the new set was based on the printed report for 1871.

The question of reform in municipal accounting became prominent in Great Britain about seventy years ago. The Quarterly for January, 1834, urged the necessity of "requiring the parish accounts to be kept in a methodical and accurate form, such as will convey clear and correct information to those who audit them, as well as to parliament and statisticians investigating the subject, on the real character of the several payments. At present," the writer continues, "all is confusion and perplexity. Each parish—nay, every successive overseer—has his own method of entering and keeping his accounts, intelligible to no one but himself." The movement throughout America, so far as it has yet made headway, is due in very large measure to the efforts of the National Municipal League; "and Chicago," said Mr. Sikes at the Columbus conference, "should get as much benefit from the League as any other city in the country." For, as Dr. Wilcox has written, "Chicago furnishes, perhaps, the best example of any American city where localism"—and he might have added paternalism—"has brought confusion and inefficiency." The application of cold accounting to the burning question of municipi-

pal reform in Chicago is due to the business sagacity of the Merchants' Club, a young and sturdy organization of public-spirited citizens, working in harmony with the efforts of many of the city officials, including the Mayor and the Comptroller. Some months ago the Merchants' Club requested of the Mayor permission to have an investigation of the city's accounting methods made by a firm of experts. The investigation occupied about six months. The report was presented by the club to the members of the city council. An order in council was thereupon passed, calling for a mixed commission to devise a plan for a department of audits and accounts. The order has been vetoed by the Mayor on the ground that the Haskins and Sells report calls for immediate action by the existing finance committee, and not by any dilatory mixed commission; which, the Mayor says, would only "discover the same old mare's nest, while but little real benefit to the city would be accomplished." At last accounts, therefore, the question of reformed accounting in Chicago was up to a standing committee of the council itself for immediate action.

Municipal accounting, as distinguished from general business accounting, is non-capitalistic; that is, the city's financial affairs do not involve, as their chief feature, the outlay of capital with a view to profit. All governmental accounts, however, ought to be controlled, organized and handled in view of efficiency of financial administration, and should enable any intelligent party in interest to follow the flow of money from the time it leaves the pockets of the taxpayers to the time it enters the pockets of those for whose services and supplies it is paid out. And this control, organization, handling and showing of accounts will be more or less dependent upon the organization and administration of the city government itself; and often upon traditional customs and habits involving, sometimes, a kind of subserviency to parties not properly in authority. Chicago has a unicameral council consisting of the Mayor and seventy Aldermen, who, with the Clerk, Attorney and Treasurer, are elected, while all other officials are appointed. But the Mayor's appointive power, seeming to promise a definite placing of administrative responsibility, is restricted, and his accountability vitiated by an opposing power of aldermanic approval and disapproval. Nearly all the city officials are salaried; a few receive a percentage compensation. A salary, as compared with the free service of the League's ideal aldermen, may not be the fittest compensation. But certainly the survival of the very unfittest is in the fee system now in operation in the office of Chicago's Treasurer, who, with his official force, may be said to be almost another semi-independent taxing body. The Comptroller, appointed by the Mayor with the permission of the seventy, is theoretically at the head of all the fiscal affairs of the city, and the department of finance might reasonably have been held responsible for the existing condition of the accounts, had not an accumulation of various complexities rendered it impossible for any set of men to bear upon their shoulders the blame that would accrue from the present state of the books. All moral charges may be laid to what, by courtesy, we must call the system or the methods; credit should be written up in full to the individuals, official and lay, who are laboring to bring about a betterment of Chicago's financial administration.

The taxes of the city proper, except delinquent taxes, are payable to twelve town collectors who are supposed to turn them over to the City Treasurer upon demand made according to the existing revenue law. And these city collections by the town collectors appear in lump in the annual report of the county collector. The town collectors, however, delay these remittances to the utmost, thus profiting by the use of the money, and the city, while waiting, borrows money at a high rate of interest. For this equivocal service, these town collectors are allowed a percentage up to a certain maximum; but for some years they have retained the percentage on the entire collection, the excess for the last five years, over and above ninety thousand dollars allowed them by law, being nearly three hundred thousand dollars. This irregularity forms one of the strong arguments for the utter abolition of the whole township system within the limits of Chicago.

Delinquent taxes and tardy special assessment collections go to the County Collector, who is also County Treasurer, who should remit to the City Treasurer every ten days. The County Collector, as in the

* Abstract of a paper read before the National Municipal League, Rochester, N. Y., May 8-11, 1901. Mr. Haskins is the Dean of New York University School of Commerce, Accounts and Finance.

case of the town collectors, also retains the use of the cash in his hands much longer than the period allowed by law, while the city borrows at such interest as it may. He has customarily reported tax deficiencies and losses to the extent of about a half million dollars a year, and these, for the past decade, have been charitably written off without question or verification. This custom is one of the arguments for reorganization of the county, and for the establishment of a Board of Audit in the city.

Revenue from licenses, water rates, special assessments and miscellaneous sources, including income from franchises, is collected by various city officials, and is deposited with the Treasurer and reported to the Comptroller, except that the Comptroller collects the miscellaneous revenue himself. Some of these receipts are very tardily reported, and some are not itemized. The franchise books are in a chaotic condition; their accounts are not audited and a few of the large debtors make no payments for five or more years at a stretch. The condition of the special assessment accounts has rendered necessary the suspension of all payment on rebates, amounting to some millions of dollars, until a complete reconstruction of the whole from the date of the great fire shall have been effected. "Too severe a criticism," said the Comptroller in his report for 1897, "cannot be made upon the lack of system prevalent and the absolute neglect to post the books and accounts in the special assessment bureau of the Department of Public Works. It was discovered that the books and accounts of that bureau were more than five years unposted, and your Comptroller was forced to refuse to honor any vouchers for the payment of rebates because of his inability properly to check the correctness of such vouchers from the books of that bureau." The reconstruction of these special assessment accounts is now in progress in the City Hall under contract with the city executive. The work will occupy some forty men about ten months, at a total cost of sixty-five thousand dollars. It necessitates a patient and extensive research into the original documents and records, and a radical readjustment and complete rewriting of the accounts. A perfect record is to be made of every warrant and the accounts are to be so arranged as to make them convenient for public use, "so that whenever inquiry is made by a citizen entitled to the information, the record of warrants, and all other records relating to the special assessment accounts will be accessible and convenient for ready reference." This reconstruction will enable the Comptroller to resume payment in the matter of the special assessments and to make full settlement from the time of the fire of 1871.

The city's expenditures are incompletely recorded; debits are often wanting in detail, and even the matter of payment is in some cases almost absurd. The incompleteness is largely due to lack of full departmental reports to the Comptroller; the want of detail is traditional, and the methods of payment are conveniences of the Treasurer's office, which is run as a quasi-private counting house. The police, for instance, are called off post to receive their little envelopes at such places as the Treasurer may choose to station his pay wagon. The constant insubordination and assertion of independence on the part of the Treasurer has led to a movement to extend the abolition of the odious fee system to his office, and put his services on a salary basis. Under the present fee system he is bonded in a sum of fictitious importance, which, however, really renders him subservient to a clique of private bondsmen. The suggestion is that as a properly amenable salaried officer he be bonded in a reasonable amount underwritten by a security company, whose interest it would be to extend to him all the benefits of a personal audit, expecting to pay the bond honestly in case of default. Chicago's accounts, considered in their entirety, are wanting in uniformity. One department has one method; another, another; and sometimes an experimental method will be adopted, soon to be superseded by another as evanescent as itself. An outline of a well rounded plan of accounting, in harmony with the system suggested by the National Municipal League, has been laid before the Merchants' Club, and will doubtless be adopted, sooner or later, by the municipal authorities. Responsible control of accounts, also, as well as uniformity and unity, is indispensable to the safe handling of public funds; it has been further

urged, therefore, as already intimated, that the council make immediate provision for the establishment of an adequate system of surveillance under a bureau of audit. The absence of a settled system of audit of Chicago's accounts is directly responsible for the interminable, tedious "battle of the books," in which many an honest reputation has been wounded if not killed outright. Officials have wrested with the crude accounts as best they might, and each has come to his own conclusion and has reported, one one amount and another another, until nobody knows whether debts are increasing or decreasing, or what the real expenditures have been, or what the assets are worth. Only a few days ago three sets of books were found to contain the same account, in which each differed from the other two, and none of them was correct.

The recent investigation of Chicago's accounts has shown that about a half million dollars a year can be saved to the municipal treasury by the immediate adoption of certain reforms comprehended within the legitimate sphere of the higher accountancy. These reforms would include a proper investment of the sinking funds now in the hands of the Treasurer; the doing away with the fee system prevailing in the Treasurer's office; the enforcement of the present laws relating to the cost of gathering the taxes; the prompt collection and distribution of special assessment warrants; the auditing of statements made by tax-gatherers; the better accounting for taxes stayed and for tax purchases, and a general change in the method of collecting taxes and special assessments. Beyond these reforms an enforcement of the ordinances relating to franchise collections is urged. These suggestions are over and above the recommendation to establish an up-to-date system of accounts and audit, the value of which is beyond all estimate. The money value of the elimination of the town organizations would be at least a quarter of a million dollars a year. The examination has further shown the wisdom of the present agitation for a new charter and for such constitutional amendment as will put the city in the way of looking after its own finances in its own way. The Honorable Lyman Gage has said that at least 80 per cent. of the people of his adopted city of Chicago desire honesty in administrative conscience, and this fact would seem to knock away the underpinning from the only respectable argument for state interference in the city's financial administration. Besides, as the same eminent authority has reminded us, "there is no reason to suppose that if the people had not virtue and capacity enough to get good government for themselves they can get any help from the people of the rest of the state, who are not so very much more virtuous or wise, and who have immeasurably less at stake." It is therefore devoutly to be wished that the popular agitation for legislative enactment and constitutional amendment looking to Chicago's financial prosperity may be crowned with the success due to the stubborn exhibition of municipal patriotism on the part of its citizens.

Chicago's motto is "I will!" Civic pride is organized in numerous clubs, associations, leagues and federations of business and professional men laboring harmoniously for the betterment of municipal conditions. Nobody in Chicago is ever discouraged, and the more dolefully you talk the more they pile up examples of cities that have been reformed by keeping everlastingly at it. These gentlemen read with gusto such words as those of Mr. Martin, of London, in the current issue of the *Forum*: "Americans," he says, "who work for a nobler city government regard the London County Council as a pattern of ability, integrity and enterprise that can only be vainly longed for on this side of the Atlantic; but, for their encouragement, they should recall the fact that not many years ago the government of London was the worst in Great Britain—unrepresentative, backward, dishonest—a subject of scorn and scoffing, and a by-word amongst provincial rulers." And Mr. Martin ought to know, for Mr. Martin was an official of a borough in which another "council of seventy" has taken the place of about a hundred and fifty members of extinct bodies. Glasgow, also, has the respect of Chicago reformers; but we have been reminded, quite recently, by a delegate from the good Quaker town of Richmond that people come from Glasgow and go to Chicago, and do not go from Chicago to Glasgow. And this assertion of Mr. Foulke's was corroborated in the person of a reverend Glasgow-Chicago gentleman who heard the statement. Chicago has agitated so many reforms, and has so often succeeded

that a member of the real estate board of that city, speaking at a former conference, said: "If you will come to Chicago you will find in operation every system that has been outlined here as good." This, as Mr. Farr was reminded, was somewhat of an overstatement. Much, however, has been accomplished, and still the agitation for reform goes on. And having now taken up the question of municipal accounting, and struck therein the keynote of present municipal reform, it may be confidently expected that the citizens of this great interior metropolis will persistently hammer away at it until there shall be a practical recognition of the vital connection between finance and accounts, accounts and audits, audits and reports, and reports and public confidence.

MODERN BRICK PAVEMENT CONSTRUCTION.*

BY W. H. TARRANT, C. E.

THE early brick pavements of this country were to a large extent failures, because of a lack of knowledge of the requirements of a durable brick pavement and the inferior quality of materials available at that time.

The first brick pavement which was constructed in the United States was at Charleston, W. Va., in 1872. This pavement had a foundation of three inches of gravel, well rolled; on this was laid inch boards dipped in coal tar, upon which was placed an inch and one-half sand cushion, then a course of common red brick laid on edge, herring-bone fashion, and a sand filler. This pavement did not give good results, and in a few years was beyond repair.

The next effort to secure a durable pavement was the common two-course pavement, which we see in so many cities to-day. The earlier pavements of this class gave scarcely any better results than the Charleston pavement, owing to the inferior materials and construction.

A few years ago the construction of a brick pavement with a concrete foundation was commenced. By rigid requirements in the specifications and the desire of the brick manufacturers to make more durable brick the result is that we have to-day the best brick pavements of any country in the world.

The object of this paper is to give a few of the many requirements of a brick pavement, with a broken stone concrete foundation, concrete curb and gutter and one course of brick. This class of pavement is the only one that will give satisfactory results. The writer will divide the subject of construction into the following heads:

First—Sub-grade.

Second—Crown of street.

Third—Concrete curb and gutter.

Fourth—Concrete foundation.

Fifth—Sand cushion.

Sixth—Laying and rolling the brick.

Seventh—Filling the interstices between the brick.

When an ordinance is passed for the paving of a street, notice should be given the property owners along the line of the proposed improvement to make the necessary gas, water, sewer and drain connections to their premises. In case this is not done by the property owner, the city should make the connections, and when the connections are used charge the actual cost, with interest, to the party making the connection. All connections should be made under the direction of the city engineer or his assistants and should be made in a satisfactory manner. If, by reason of neglect or oversight, the private connections are not made until the pavement is completed and the connections are desired, application should be made to the city clerk and an amount deposited sufficient to make the desired connection, concrete the trench and re-lay the pavement. The work should be done by the city, and when completed, if the amount deposited is larger than the actual cost of connection, the balance should be rebated to the applicant.

If at any time the city authorities grant a franchise or privilege to any company or corporation necessitating the tearing up the pavement to lay gas, water or any other mains or connections, there should be a stipulation in said franchise requiring said company or corporation to remove all surplus dirt from the trenches; and, after the mains are properly laid, fill the trench with broken stone or gravel

concrete to the required depth; and, in case this is not done, fill the trench with cinders, gravel or well-tamped clay to within eighteen inches of the top of the concrete foundation. Remove from the sides of the trench enough soil, commencing at the sub-grade and running outward at an angle of 30 degrees, to make a ledge of six inches on either side of the trench, filling the trench with gravel or broken stone concrete upon which to re-lay the pavement.

With the various connections completed before the awarding of the contract, there can be no delay to the contractor by reason of connections along the line of work. The grading should be done in the following manner: When excavation is necessary, no plow should be used within three inches of the finished sub-grade. The remaining excavation should be dressed off with hand tools. Where filling is necessary it should be done in layers of not more than four inches, each layer well dampened and rolled. All soft and spongy places should be removed and filled with gravel well rolled. The surface after being brought to sub-grade (with allowance for rolling) should be thoroughly rolled with a roller at least five feet in width and weighing not less than two hundred and fifty pounds per inch of width. After the sub-grade is thoroughly rolled and ready for the concrete foundation, no loaded or empty wagons or other vehicles should be permitted on the sub-grade, unless it be protected by a covering of boards. All paving materials should be placed along the line of the proposed improvements before the completion of the sub-grade.

The cross-section of the street should be parabolic in form, with the vortex of the parabola in the middle of the street. The writer finds excellent results by making the crown of the street equal to 0.014 the width of the street in feet plus 0.03 feet, the constant .03 of a foot being added to the middle ordinate of the street so as to slightly elevate the center and thus avoid a flattened place in the street. By this method we secure better drainage and a cleaner street.

For the residence portion of a city there is no one feature of a brick pavement which adds more to the pleasing appearance of the street than a concrete curb and gutter, and when properly constructed and first-class materials are used it will be as durable as any other portion of the pavement. The gutter should have a width of eighteen inches and a curb a thickness of five inches for a street having a width of thirty-six feet. The gutter should have a slope of one inch toward the curb. The height of the curb above the gutter should be seven inches, the upper face edge and the junction of the curb and gutter should have a radius of one and one-quarter inches. The thickness of the gutter should be six inches and the curb five inches, and the construction should be such as to make the curb and gutter one solid mass.

The foundation should be six inches of gravel or cinders, well dampened and thoroughly tamped with a tamper, having an area of not less than thirty-six inches and weighing not less than thirty pounds. The concrete portion of the curb and gutter should consist of one part Portland cement and five parts clean gravel. The cement and gravel should be thoroughly mixed dry and then water added until it is a little more than moist, then placed in forms and well tamped with a tamper, as described for the foundation. The writer is of the opinion that the secret of the first-class concrete curb and gutter is to have the concrete well tamped. The finishing coat should be one inch in thickness and consist of one part of Portland cement and one and one-half parts of clean, sharp sand. The finishing coat should be placed on the concrete portion before the concrete has begun to set, and thoroughly troweled, so as to give a perfect bond between the two. If this precaution is taken there need be no fear of hollow blocks. The concrete curb and gutter should be made in alternate sections and in length of seven feet.

The finished curb and gutter should be protected from the sun and wind by a covering of canvas for at least twenty-four hours. In extremely dry weather the curb and gutter should be sprinkled once a day for three or four days. The catch-basin inlets should be built in the curbs. The best form of inlet is the cover inlet with vertical bars. This inlet will never become clogged by leaves or rubbish on the street.

One of the most important parts of durable brick pavements is the concrete foundation or sub-structure for the brick. This is one portion of the pavement which, in many instances, is neglected, and

* From the Clay Record, Chicago.

one which should have the greatest care. One of the primary elements of a first-class foundation is to have a perfect sub-grade upon which to lay the concrete.

The concrete should be composed of one part of American natural hydraulic cement, two parts of clean, sharp sand and four parts of broken stone. If Portland is used instead of the natural cement the proportions should be one of cement, three of sand and six of broken stone, or if the gravel is used instead of the broken stone, one of Portland cement to eight of gravel. In recent experiments with the broken stone concrete and gravel concrete (using the natural cement in the broken stone concrete and the Portland cement in the gravel concrete), the gravel concrete gave an increase of strength of 30 to 50 per cent. over the broken stone concrete. The thickness of the concrete foundation should be six inches, and under all street car tracks the concrete should have a depth of six inches below the bottom of the ties.

The sand and cement should be thoroughly mixed dry until it has a uniform color. Add enough water to give it the proper consistency; then add the broken stone; mix three times and then shovel into the work. To give the surface of the concrete foundation the proper crown, the best method is to set a line of stakes along the center of the street about three feet apart, then by means of a templet with one end on the center stakes and the other on the curb, set a line of stakes perpendicular to the curb line and about three feet apart, driving the stakes to the exact surface of the finished concrete. By this method the grader has ample opportunity to bring the surface to a perfect grade.

One of the most important parts of the concrete foundation is the tamping of the concrete, and it is one which is very often neglected. The concrete should be thoroughly tamped with the tamper weighing not less than thirty pounds and having an area of not more than twenty-five inches. After it is sufficiently tamped with the iron tamper and any hollow places appear they should be filled with cement mortar and again tamped with an oak tamper about eighteen inches square. The surface of the concrete should then be paralleled to the surface of the finished pavement. Much depends upon this, and if not done, the pavement, when completed, will be flat in places and have a wavy appearance. After the concrete has set a few hours it should be covered with a half inch of clean, moist sand. In extremely dry and hot days it should be sprinkled a few times each day until the brick are laid.

The sand cushion should be of clean dry sand and have a thickness of one and one-quarter inches. The sand should be graded by means of a templet having the exact contour of the street. It should be so constructed that one end of the templet will rest on strips in the center of the street and the other on the curb. The sand at all times should be perfectly dry.

The brick should be laid in rows perpendicular to the curb, except at street intersections, where they should be laid at an angle of 45 degrees. Bats should only be used in commencing the rows and making the closures, and in no other places. The brick should be laid with the least possible space between them. Wheeling on the pavement should be done on boards and the brick should be dumped from the barrows in the direction of the rows. After the brick are laid they should be carefully inspected, and all chipped brick should be turned, the soft and defective ones thrown out and replaced with good ones.

The best method of laying brick between street car tracks is to lay the brick parallel to the rails. One row on the outside of the rails should also be laid parallel to the rails. This row gives the trackmen a chance to tighten up the bolts or to drive spikes without molesting more than one row.

The first row on the inside should be laid flat, when a six-inch "T" rail is used. The remaining rows are laid on edge, and if the three and three-inch brick are used no cutting is necessary.

The rolling of the brick should be done parallel to the curb, commencing at the centre and rolling toward the outside. It should be done with a roller weighing not less than 200 pounds per unit inch in width. The pavement should be rolled at least three times. After the rolling is done the brick should have their final inspection and all broken or chipped brick removed, and replaced with good ones.

If the brick are standard brick and not repressed, sand makes the best filler, but if they are repressed brick the Portland cement should be used. If the manufacturers of paving brick would discontinue the use of the repress machine we would have a better quality of brick. The repressing of the brick destroys the bond which is given the clay when it comes from the brick machine and the repress machine does not put enough pressure on the brick to make a new bond. The result is that after the brick are burned and placed in the street they scale off on the edges. In the standard brick the bond is not broken and the brick do not scale or chip in the street.

If the sand filler is used the sand should be clean, sharp, dry and fine. The sand should be placed on the street in thin layers and thoroughly broomed into the joints with steel brooms. When the interstices of the pavement are all filled a half inch of sand should be left on the pavement.

If the grout filler is used it should consist of one part of Portland cement and one part of clean, sharp sand. The cement and sand should be thoroughly mixed dry, in a tight box about two and one-half feet wide and about four feet long. Water should be added until it has the consistency of thick cream, then poured on the pavement and broomed into the joints. It should be applied in two courses, the second course be mixed a little thicker than the first. When the joints are well filled and the cement is allowed to set a few hours, a coat of sand should be placed over the pavement to protect the grout from the wind and sun. The grout should be allowed to set from seven to ten days before the traffic is turned on the street.

STREETS AND STREET PAVEMENTS.

BY H. G. TYRRELL, C. E.

A GOOD street pavement requires that it shall be hard and smooth, so that the force of traction shall be a minimum; that it shall secure for horses a good foothold; that it shall be as noiseless as possible; that it shall be as easily cleaned as possible; that it shall not absorb and retain the surface liquids; and that it may be easily removed when necessary so that the water and gas pipes may be repaired.

Broken stone and gravel, although less noiseless and giving a better foothold to animals than stone or wood pavement, are lacking in durability for cities where there is large traffic. They make, however, first-class streets for parks and suburban drives.

Since one great object in pavements is to support great weight, if a firm foundation be not provided the blocks of the surface would sink and form into ruts.

Cobblestone pavements, which are now very largely used through the United States, consist of a foundation of sand and gravel, or a mixture of them, with the cobblestones firmly set on their smallest end and close together. When placed they are settled with a heavy rammer, giving to the surface a convexity of about 1 in 40 to 1 in 45. A top layer of two or three inches of gravel is spread and worked down between the stones. This pavement is very defective in that it is rough and noisy and the gravel is liable to be worked into mud. It is also difficult to clean, and the stones are frequently worked down into the sand foundation, forming ruts and depressions. It is also very severe on vehicles and animals, and altogether is very unpleasant to travel on.

Rubblestone pavement is superior to the last described inasmuch as it is easier cleaned and offers much less resistance to vehicles. The stones should be from three to six inches in breadth, six to twelve inches long and five to six inches deep. They are laid similar to cobblestones, care being taken not to have continuous joints parallel to the sidewalk.

The blocks for stone block pavement must all be of the same size, otherwise they will settle unevenly. Since each stone is exposed to the total load of one wheel it must be large enough to resist crushing. In the direction of the street the blocks should not be more than three and a half or four inches, so that horses may secure a good foothold. The other dimensions should be ten or twelve inches across and eight or ten inches deep.

The stones are laid in continuous courses across the street either at right angles or at an inclination of from 45 to 60 degrees with the sidewalk. The crevices are either wedged with splinters of stone or

filled with gravel. On inclines, the stones should if possible be chosen thinner at one edge than the other, the thicker side being apart, the cavities being filled as before with fine gravel. This latter system is especially applicable on slopes since it assists the surface water into the side drains.

The Belgian Pavement. The blocks for this pavement are cubical in form, each side being as nearly six inches as possible. The natural soil is first excavated thirteen inches, upon which eight inches of clean, coarse sand and gravel is laid and compacted by ramming or with rollers. When the soil is very soft the amount of gravel must be increased or concrete resorted to. In no case should the pavement be laid more than fifteen feet in advance of the rammer. This pavement differs only from the Guedit in that for the latter a foundation of six inches of concrete is used as foundation instead of gravel.

A variety of wood pavements have been tried, but most of them have proved unsuccessful. One, however, which is now being largely used throughout the country, seems to indicate success. It is made in the following way:

Wood Block Pavements. The soil is first excavated to a depth of nineteen inches, the same curvature being given to the natural bed as is intended for the finished surface. Curbing made of cedar and not less than four inches in thickness is placed along either side and is supported by cedar posts planted at intervals of about twelve feet. A foundation of coarse sand spread evenly to a depth of eight inches is now laid, and is brought to the required convexity about one in forty by passing a screde, cut to the proper curve, over it. The sand is now sprinkled and then rolled, after which it is sprinkled and rolled again, more sand being added as required so as to keep the finished foundations up to eight inches. On this foundation circular cedar blocks, varying from six to twelve inches in diameter and seven inches in depth are laid on end. Fine gravel and sand is now worked in between the blocks with stiff brooms set at right angles to the handle and afterwards pounded with an eighty-pound rammer. A top dressing of coarser gravel is then applied and the road is ready for traffic.

Asphalt Pavement. The natural asphalt rock such as is used for street covering should contain about twelve per cent. of mineral tar and eighty-eight per cent. of amorphous carbonate of lime. But as this portion of mineral tar is not found more should be added. If the rock is heated up to 212 degrees Fahrenheit it crumbles into an amorphous powder and in this state it is spread to a thickness of two and never more than three inches, after which it is compressed by rolling or ramming and in two or three hours may be thrown open to traffic. In this condition it is tougher and more durable than it was even in its natural state. The foundation for this covering is the same as was used in the stone block pavement. The asphalt is sometimes first moulded into blocks like stone before it is laid. The cost of this pavement per square yard is from \$2.70 to \$2.80.

Its strength was thoroughly tested on Fifth avenue, New York, by passing a stone truck, loaded with a twenty-one-ton boiler, over it, when no impression was left. This, then, we see possesses nearly all the properties of a good pavement. It is hard and smooth, yet rough enough to give horses a good foothold; it is easily cleaned and readily discharges the rainfall into the side ditches. It gives complete protection from frost to the water pipes, and sewers are never burst, and it is always free from dirt and mud.

In classifying the three kinds of pavement in order of merit, supposing all to have first-class foundations, the stone block comes first and asphalt next. Unless, however, the stone is of the very best quality it takes the second place, the asphalt first.

Sidewalks are usually made of either flagging stones, brick, concrete or wood in the form of plank or blocks.

A concrete footpath should be three and a half to four and a half inches thick and should be supported by a good foundation of sand or fine gravel. If it is required to prevent frost a layer about a foot thick of broken stones or coarse pit gravel finished off with an inch of fine gravel is laid, upon which the concrete is spread. The following proportions make a very suitable concrete:

Rosendale or any other good cement.....	1 measure
Clean sharp sand.....	2½ "
Stone and gravel.....	5 "

When this has hardened a fine covering of one volume of Portland cement two to two and a half fine sand is spread to a depth of one-half inch. After being well packed it is covered with hay to protect it from the sun till hard and to prevent it from drying too rapidly. Even after the street has been opened to traffic it is necessary to keep it covered for a few weeks with a thick layer of damp sand. The concrete for this purpose must have such a proportion of water that each blow of the rammer will be "distinct, local and permanent."

Asphalt foot paths may be laid on from three to four inches of concrete and the covering must not exceed three-quarters of an inch. In very wet soil the concrete may rest on four or five inches of sand.

Flagging stones laid upon the natural soil or on a preparation of sand and gravel where the ground is wet makes probably the best walk. A convenient sidewalk for parks and suburban streets is made of gravel and broken stones in exactly the same way as has been described in making roads.

Sidewalks of brick and plank, especially the latter, are largely used, but they need no explanation.

SUGGESTIONS AT PAN-AMERICAN EXPOSITION.

BY HERBERT SHEARER.

ESTHETIC features pertaining to city, town and village ornamentation have received a fitting tribute in the decoration of the Pan-American grounds. Entering at the Elmwood gate the artistic display of shrubbery, flowers and grass plots bordering the walks and drive-ways is one of the most pleasing views in connection with the Exposition. Universal civic improvement throughout the country will, no doubt, receive an impetus from this display that will have a far reaching and lasting effect.

Taken in connection with proper scientific sanitary safeguards the proper embellishment of city streets, squares and boulevards, not forgetting front and back yards, is one of the important problems before the citizens of every city, village and hamlet in the country.

Mr. W. Scott, assistant superintendent of floriculture, has fully appreciated this fact in his elaborate decorations at the Pan-American grounds.

A succession of flowers is provided in a systematic manner that he terms a floral calendar. It is so arranged as to designate each summer month by flowers that bloom during the time. To carry out this idea for the month of May he planted about one hundred and fifty thousand tulips, thirty thousand hyacinths, ten thousand narcissus and twenty thousand pansies; the bloom provided by this collection indicates the first half of the month. It is to be succeeded about the 15th with geraniums and begonias. Visitors becoming so engrossed with the wonders to be met with at the Exposition that they lose track of the time, may thus be set right.

Sixteen large beds of hardy roses will furnish a characteristic bloom for the first part of the month of June, to be succeeded with other flowers as the summer advances, thereby keeping up a continual succession throughout the entire Pan-American season.

Woven in with the general floral plan are many other kinds of plant decorations which lend themselves for a setting to this general arrangement, among which are about one hundred species of herbaceous plants or hardy perennials, making a very handsome display in this particular. There is also a large bed of crimson ranby roses consisting of eight hundred plants. Large displays of evergreens, such as pines, spruces, cedars, etc., including many specimens not before exhibited in this country.

This section of the grounds at present presents a very beautiful and attractive appearance which will be continued by these succeeding species, thereby always presenting a fresh attraction, no matter how often the Pan-American visitor may pass this way.

Esthetic utility is in this manner emphasized and embellished by the lighter, though by no means less important attraction that makes the world turn around, thereby presenting the extremely important question of civic improvement in an entirely new light. Advanced thinkers along this line cannot pass through this section of the grounds without carrying away with them a renewed inspiration that will aid them in farther efforts towards improvements in this direction.

COMMON SENSE IN STREET LIGHTING.

BY EDWARD B. ELLICOTT.*



EDWARD B. ELLICOTT.

THE lighting of public streets is a problem that can only be solved by a careful consideration of local conditions. What would be adequate lighting in one city might be inadequate in another, which makes it difficult to make comparisons without first considering local requirements. The arc light is generally recognized as the standard of excellence, and in most instances is far more satisfactory than any other form of lighting; it is used for fully 80 per cent. of the street lighting in cities over 5,000 in population.

The recent successful introduction of the incandescent mantle, to be used with gas or gasoline, has brought a new factor into the field of street lighting. The character of light obtained from this lighting is practically the same as from the arc lamp, but naturally much less in volume. Under certain conditions this class of lighting is entirely adequate, highly efficient, and economical.

For the purpose of comparison the lighting of the average city may be divided into three sections: Business, residence, and vacant or sparsely settled.

These may be found in every city, and the general conditions and requirements will be similar. Each section requires a lighting system which is adequate to its needs. A business street needs to be brilliantly and attractively lighted, a residence street should be well lighted, but not obtrusively so. Arc lights are not pleasing to many in residence districts on account of the added publicity to residences and grounds, due to the brilliancy of the light. This condition, however, only applies to those residences that may be located in the immediate vicinity of the lamp.

For the purpose of lighting business streets no other than the arc light has been found satisfactory, and lights placed 175 feet apart furnish all the light that could be considered necessary. A satisfactory light may be obtained with lamps placed 250 feet apart, but any greater distance leaves a part of the street inadequately lighted for business purposes. In residence sections, where arc lamps have been installed and the trees do not obstruct too much of the light, the lamps may be placed 350 to 400 feet apart and still furnish a satisfactory light.

Gas and gasoline lamps equipped with the incandescent mantle are satisfactory for residence street lighting when properly placed and maintained. Each lamp will furnish a full 60 candle-power and proper distribution of the light fully compensates for the difference in the total candle power as furnished by the arc light, which furnishes many times more light, but at one central point, where a much less quantity would be sufficient.

The 60 candle-power lamps should be placed on alternate sides of the street and at a distance of 125 feet apart in residence districts that are well built up and where a maximum of light is required, and at a distance of 200 feet apart in the more sparsely settled districts. The relative cost and efficiency of these forms of street lighting can be accurately compared by assuming a cost of \$100 per year for each 2,000 candle-power arc light and \$28 a year for each 60 candle-power mantle lamp, these figures being the average cost of rented lamps on the basis of full schedule lighting.

The cost of lighting 1,000 feet of street would be as follows:

ARC LIGHTING.			
Distance apart.	Average No. required.	Cost.	Efficiency of lighting.
175 feet	5.7	\$570.00	100. per cent.
250 feet	4.	400.00	48.7 per cent.
350 feet	2.88	288.00	24.9 per cent.
400 feet	2.5	250.00	19. per cent.

* City Electrician of Chicago, who read the paper before the fourth annual meeting of the League of Ohio Municipalities, held at Cleveland, May 14-16, 1901.

60-CANDLE-POWER MANTLE LIGHTING.

125 feet	8	\$224.00	100. per cent.
200 feet	5	140.00	39. per cent.

The efficiency of 100 for arc lights placed 175 feet apart and for mantle lights placed 125 feet apart is an arbitrary figure and used for the purpose of comparing the lighting qualities of lamps placed at greater distances apart, assuming that the lamps so placed would light the street properly. It is generally supposed that the lamps placed 200 feet apart give one-half the effective light on the street that the same lamps would if placed 100 feet apart, but this is an error. The effectiveness of the light upon the street decreases as the square of the distance from the light, consequently the general lighting effect must vary in the same proportion.

To state this more plainly, at a given point we have 2,000 candle-power, while at 100 feet away we find 400 candle-power, and at 200 feet we find but 100 candle-power. Therefore, the quantity and value of light has dropped, at a distance of 200 feet, to one-twentieth of what it is at the location of the light. This fact of producing a great quantity of light at one point in order to secure a small amount at a distance of 200 or 300 feet would indicate that there can be much improvement made, where conditions will permit, by substituting a larger number of smaller units of light for the larger units, with which are produced, at one point, so much light not needed.

With arc lamps placed 175 feet apart at a cost of \$570 per 1,000 feet of street per year and a lighting effect equal to 100 per cent. efficiency, the same lamp if placed 400 feet apart would cost \$250 per 1,000 feet per year, a saving of over one-half the cost, but the general lighting effect would have dropped 81 per cent. This low efficiency of general lighting effect, with lamps of large candle power placed at such distances apart, makes favorable condition: for the comparison of mantle lamps.

The same 1,000 feet of street with arc lamps 400 feet apart would be much more efficiently lighted with eight 60-candle-power lamps placed 125 feet apart and costing \$224 per year, although the total candle-power of the mantle lamps would be only 480, as against 1,200 candle-power for the arc lamps. The gain in the efficiency is due to the proper distribution of the light which is made possible by the greater number of units of 60 candle-power.

It is probable that in at least one-half of our cities the general lighting efficiency of the systems used does not exceed 20 per cent. of the light really produced, and it means that the redistribution of the lights and the substitution of high candle-power mantle lamps in certain sections would largely improve the general lighting effect and in many instances substantially reduce the cost.

A careful study of this subject and its application on the lines described has secured a marked improvement in the lighting and a considerable reduction in the annual cost of lighting certain sections in the city of Chicago. During the year 1899 the city was renting 10,000 lamps of 14 candle-power at a total cost of \$140,000. A total of 140,000 candle-power was maintained. A change to 60 candle-power lamps was made in 1900, and 4,500 lamps were substituted for the 10,000 lamps of 14 candle-power. The annual cost was then on a basis of \$124,000 with a total candle-power of 270,000. The quantity of light was nearly double and the cost reduced \$15,800. The general lighting results were so satisfactory that the City Council appropriated for the erection of 2,000 more lights of the same character, to be installed during the current year.

The proper and economical lighting of a city is a matter of judgment and common sense. There is nothing of a scientific nature about it, and any one that cares enough about the subject to familiarize himself with the different classes of lights and the most simple rules to determine their relative efficiency for street lighting purposes can easily accomplish as good results as the most experienced experts. The trouble in most cities is due to the fact that very little attention is paid to the general lighting results and too much attention to the total cost. It is possible in some instances to reduce this total cost and at the same time secure a much better lighting system.

Every city should thoroughly investigate the lighting system in use and ascertain what general results they are obtaining. The fact that the first cost of the light is lower than some other cities

may be paying does not necessarily mean that the money is being economically and efficiently expended—perhaps the other cities are obtaining 50 per cent. more light at a small increase in cost.

In order that the best results may be obtained from any kind of light used the lamps must be kept absolutely clean. A small accumulation of dirt on the globes intercepts a large amount of the light. Too little attention is paid to the care of lamps by companies furnishing rented service. It does not cost any more to keep the lamps clean and secure the maximum results than it does to allow the dirt to accumulate and intercept a considerable quantity of the light.

The same argument applies as well to municipal ownership of street lighting systems. The real object of a street lighting system is to furnish the best light possible for the accommodation and safety of the general public, and it should be placed in the hands of and controlled by those who are responsible for such accommodation and safety. Economy is not the only object of a city government—there are responsibilities to be assumed, and one of the most important is to light its streets. If the local conditions are such that the service rendered by a local company is satisfactory and is likely to remain so, it would be difficult to make a better showing with a municipal plant. But these conditions rarely ever exist. These conditions do not exist in Chicago, and the city is rapidly lighting its streets from its own plants. Three stations are now in operation with 4,339 arc lamps in service—an increase of 3,000 lamps in less than four years.

The conditions are not the best for municipal ownership for the following reasons:

1st. The lamps are distributed over sixty-six square miles of territory, which naturally increases the cost of attendance.

2d. The wages paid the men are the highest in the United States for the class of work done and hours worked.

3d. The cost of coal is \$3.65 per ton for run of mine, West Virginia quality.

Even with these fundamental items of expense at a disadvantage, the city is operating its lamps at a cost of \$60.98 a lamp per year, allowing \$2.73 a lamp for depreciation. The lowest price ever quoted the city for rented lights covering any reasonable section of the city is \$103 a year where lines are placed overhead, and \$137 where lines are placed underground. About one-half of the municipal lamps are operated from underground lines.

To give an idea of what the city is saving each year, it is but necessary to compare what rented lights would have cost last year and what the municipal lights cost. The total amount at rented prices would aggregate \$458,020, and the operation of municipal plants cost only \$265,129, including interest—a clear saving in one year of \$192,891.

In the last thirteen years the city has paid out in building and operating its plants a total of \$2,786,100. The same number of lamps operated under private contract would have cost \$2,507,110. Thus it will be seen that the city has only invested \$278,989 more than it would have paid for rented service, even after allowing interest throughout the thirteen years.

This complete street lighting system for 4,339 arc lamps has actually cost the city \$278,989. In another year it will have saved its entire cost, and it stands as an example of what can be done by a city in the municipal operation of a public street lighting system. It depends upon local conditions and elimination of politics for other cities to accomplish a like result on a greater or smaller scale, depending in a measure upon the number of lamps required and the rates paid for rented service.

The number of German cities having electric railways was, on January 1, 1901, 107, as against 88 in 1899. The total length of track was, on September 1, 1900, 1,792 miles; the number of motor cars used was 5,994; the number of trail cars 3,962. The total power output for the roads was 75,608 kilowatts from engines and 16,890 kilowatts from storage batteries. Three places have storage battery traction alone and six have mixed storage battery and overhead wires. As a comparison of the development of the electric railway in Germany and in the United States it may be stated that on September 30, 1900, the State of Massachusetts had 1,913 miles of track, with 6,531 motor cars.

LONDON BOROUGH STATISTICS.

Name.	Population.	Rateable value.	Per cap. rate. val.	No. Aldermen.	No. Councillors.
Battersea	165,115	£930,876	£5.63	9	54
Bermondsey	137,585	847,365	6.15	9	54
Bethnal Green	129,162	464,821	3.51	5	30
Camberwell	253,076	1,209,076	4.77	10	60
Chelsea	75,196	754,832	10.03	6	36
Deptford	107,273	553,267	5.15	6	36
Finsbury	109,961	109,961	1.00	9	54
Fulham	113,781	677,897	5.94	6	36
Greenwich	84,429	561,528	6.66	8	30
Hackney	213,044	1,113,145	5.22	10	60
Hammersmith	104,199	624,348	5.99	6	36
Hampstead	75,449	875,166	11.59	7	42
Holburn	67,400	841,925	12.63	7	42
Islington	336,764	1,829,274	5.43	10	60
Kensington	170,465	2,147,145	12.59	10	60
Lambeth	297,613	1,756,193	5.90	10	60
Lewisham	99,962	770,662	7.70	7	42
Paddington	145,956	1,413,151	2.75	10	60
Poplar	169,267	750,934	4.43	7	42
St. Marylebone	141,188	1,625,287	11.15	10	60
St. Pancras	240,674	1,677,350	6.96	10	60
Shoreditch	122,385	716,105	5.85	7	42
Southwark	206,582	1,184,599	5.73	10	60
Stepney	295,315	1,358,308	4.59	10	60
Stoke Newington	50,377	322,504	6.40	5	30
Wandsworth	184,684	1,385,754	7.50	10	60
Westminster (City)	193,465	5,062,720	26.17	10	60
Woolwich	106,477	568,463	5.37	6	36



SOCIETY OF MUNICIPAL IMPROVEMENTS.

THE eighth annual meeting of the American Society of Municipal Improvements will be held in the city of Niagara Falls, N. Y., October 1 to 4 inclusive. This is the oldest of the municipal societies and generally leads in the diversity of its subjects discussed. Although its membership is confined to cities, and the expenses of delegates usually paid by the municipality, it is by no means a junketing excursion. All papers are carefully prepared and their presentation is the signal for a most thorough discussion. A copy of the annual proceedings should find a place in every municipal library because of the large amount of practical information contained.

A most attractive programme is in course of preparation for the next meeting, which will be fully announced in THE MUNICIPAL JOURNAL. In addition the members will be given an opportunity of inspecting some of the numerous plants attached to that locality by the enormous electric power now produced by the falls. The Pan-American Exposition is but an hour's ride from the falls and it will be an easy matter to take in the sights on the same trip.

MEETING OF THE NATIONAL MUNICIPAL LEAGUE.

THE annual meeting of the National Municipal League was held at Rochester, N. Y., during the first part of last month. The principal themes for discussion and review were the reform movements in different cities, charter legislation and municipal accounting. The review of the municipal situation in the United States was given in a most comprehensive manner by Secretary Woodruff, the larger part of which will be found elsewhere in this number.

One of the most interesting features of the meeting was a report of a committee on instruction in municipal government in American educational institutions. This report was presented by Dr. Thomas M. Drown, of Lehigh University, chairman of the committee. Letters sent to 357 colleges and universities had resulted in 222 replies, of which about 40 had stated that the institutions concerned had courses of instruction in municipal government. The committee is working on a bibliography for the guide of those who are teaching municipal government, and it is also preparing suggestions for a course of study.

An interesting paper on the municipal accounting of Chicago was presented by Mr. Charles W. Haskins, of New York, which appears elsewhere in this number.

INDIANA LEAGUE MEETING.

THE Municipal League of Indiana is one of the most active of the State leagues. It meets twice a year and held its last session at Columbus early in May. Many helpful papers and addresses were presented and great enthusiasm was manifested throughout the convention. The next meeting will be held at Anderson in October next.

The innovation of making one of the convention days "ladies' day" was so successfully carried out that it is not likely to be omitted from another programme of the State League. Many of the delegates present thought that ladies' day was the most profitable of all, and that the papers read and addresses given were above the average of the efforts of the men. The paper of Miss Jennie Elrod, of Columbus, upon "Municipal Ownership of Libraries" was among the best given. It will be found elsewhere in this number.

MUNICIPAL DAY AT PAN-AMERICAN.

THROUGH the efforts of Secretary John MacVicar of the League of American Municipalities, the managers of the Pan-American Exposition have set aside August 26 to be observed as "Municipal Day." Mr. B. F. Gilkinson, formerly secretary of the League, has been placed in charge of the programme, which will call for a number of addresses from prominent people who are fitted to speak upon the various phases of the municipal problem. Among those who have accepted an invitation to speak upon that day are: Mayor Thomas G. Hayes, of Baltimore, "Municipal Government on Business Principles;" Mayor Carter H. Harrison, of Chicago, subject to be announced; Mayor Thomas N. Hart, of Boston, subject to be announced; Mayor Samuel M. Jones, of Toledo, "Liberty in Municipal Government;" Mayor Paul Cappelleville, of New Orleans, subject to be announced; Mayor James K. McGuire, of Syracuse, "The Municipal Lodging House;" Mayor James A. Johnson, of Fargo, N. D., president of the League of American Municipalities, "Municipal Ownership of Public Service Industries in Europe;" Hon. Randolph Guggenheimer, president of New York City Council, subject to be announced; Mr. Morris W. Mead, Superintendent Bureau of Electricity, Pittsburgh, subject to be announced; Professor Edward W. Bemis, Mt. Vernon, N. Y., subject to be announced, and Mr. William S. Crandall, editor MUNICIPAL JOURNAL AND ENGINEER, New York, "The Predatory Corporation." Elaborate preparations are to be made for making this day especially attractive to the city officials of the United States.

MEETING OF THE OHIO LEAGUE.

THE three days' session of the Ohio League of Municipalities, which was held at Cleveland last month, will not be forgotten for many a day because of its unique features. Among other events which made the gathering notable was the dinner given at the Hollenden to the delegates by Mayor Johnson. There were fifty guests present and the theme of the evening was introduced by the host in a short address upon the question of taxation. As that is a particularly live topic of conversation in municipal circles throughout the Buckeye State just at present, owing to the fact that this is the year in which the decennial appraisal is made, Mayor Johnson struck a familiar chord when he touched upon that subject. The situation as it exists in Cleveland is shown up elsewhere in this issue in an article by Professor Bemis, who tells something about Mayor Johnson and his work.

There were many valuable papers presented to the convention, but none more interesting than that of Mr. Edward B. Ellicott, city electrician of Chicago, which dealt with the street lighting problem. It will be found elsewhere in this number. Some of the other papers read will appear in future numbers of THE MUNICIPAL JOURNAL.

The last session of the convention was held just previous to the banquet on Thursday evening, when the following corps of officers were elected: Hon. J. R. Lindemuth, Mayor of Dayton, president; Hon. J. B. Johnson, Mayor of Urbana, vice president; Dr. S. O. Griffin, of Columbus, secretary; Hon. J. L. Orbison, ex-Mayor of

Carthage, treasurer; Mayors C. W. Linkhart, of Xenia, and John C. Cassida, of Bellfontaine, and Councilman D. W. Williams, of Niles, trustees.

The next meeting will be held at Columbus upon the invitation of the Board of Trade of that city.

THE JAMESTOWN MEETING OF THE L. A. M.

CITY OFFICIALS throughout the United States were never more deeply concerned about the faithful discharge of their duties than at the present time. Despite the slurs to the contrary the average city official would rather perform his work with honor to himself than be delinquent in any particular. For this reason the mayors, councilmen and heads of departments are looking forward to the coming session of the League of American Municipalities, at Jamestown, N. Y., with more than ordinary interest, for they expect to learn much at this convention. Many cities are already laying plans for the prospective trip, beginning thus early in order to avoid any possible slip "twixt the cup and the lip." And it behooves other cities, likewise, to take old "Father Time" by the forelock and provide against the contingencies which might arise at the last moment to prevent the sending of a representative delegation to this important gathering.

In arranging for the trip it will be well to remember that Jamestown is near neighbor to Buffalo, where a week or more can be profitably spent by the inquisitive official and student of civic affairs.

Secretary MacVicar has sent the following interesting list of subjects which will be discussed at Jamestown: "The Value of Municipal Leagues," "Local Self-Government for Cities," "Constitutional Restrictions Over Cities," "Municipal Charities," "Municipal Ownership, Pro and Con," "Sewage Disposal," "Garbage Disposal," "Municipal Water Supplies," "Special Assessments for City Work," "The Contract System," "The Prevention and Control of Epidemic Diseases," "Regulation of Saloons," "Remuneration of Cities for Franchise Rights," "Street Paving," "Street Lighting," "The Fire Department," "The Police Department," "Taxation," "Public Band Concerts," "Municipal Street Railways," "Regulation of Rates for Public Service Industries," "Single-headed Commissions or Council Committee," "Uniform Municipal Accounting," "Public Baths," "Parks and Play Grounds."

CONVENTION DATES.

JUNE.

The State Mayor's Convention for Connecticut will be held at Bridgeport, June 4. Mayor Sterling, Bridgeport, president.

The State Firemen's Association for South Carolina meets at Newbury, June 5-6. J. R. Hayner, Greenville, S. C., secretary.

The International Fire Congress is to be held in Berlin, Germany, June 6-8.

The Independent Telephone Association of the United States meets in Buffalo, June 11-13. Sam. E. Wayland, secretary, Scranton, Pa.

The North Dakota Firemen's Association convention and tournament will be held at Dickinson, June 11-13.

The Michigan State Firemen's Association convenes at St. Clair, June 12-13.

The National Fire Protection Association will hold its fifth annual meeting in Chicago, June 11-13.

Maryland State Firemen's Association will meet at Westminster, Md., June 12-13, 1901.

The Independent Telephone Association will meet at Buffalo, N. Y., June 11, 12, 13, 1901.

The American Art and Outdoor Association will meet in Minneapolis, Minn., in June, 1901.

The Minnesota State Fire Department Association meets at Crookton, Minn., June 12-14, 1901.

The Illinois Firemen's Association holds a tournament at Dixon, Aug. 13-15.

The Southwestern Firemen's Association Convention and Tournament will be held at Fort Smith, Ark., June 18-21, 1901.

The Canadian Electrical Association meets at Ottawa, Ont., June 19-21, 1901. C. H. Mortimer, secretary, Toronto, Can.

League of Cities of the Third Class of Pennsylvania will hold its second annual session at Erie, Pa., June 26-28, 1901.

Firemen's muster at Springfield, Mass., will be held under auspices of the Veteran Firemen's Association, June 20, 1901.

The American Institute of Electrical Engineers meets at Buffalo, June 10, 1901. Ralph H. Pope, 26 Cortlandt street, New York secretary.

American Water Works Association, Peter Milne, C. E., secretary, will be held in New York City during the week beginning June 17, 1901.

The National Social and Political Conference will take place in Detroit, Mich., June 28-July 2, 1901. D. J. Meserole, secretary, 160 Joralemon street, Brooklyn, N. Y.

The American Society of Civil Engineers will meet at Niagara Falls, June 25-28, 1901. Charles Warren Hunt, 220 West Fifty-seventh street, New York City.

The Wisconsin State Firemen's Association meets in Plymouth in June.
The Wisconsin State Municipalities Convention meets at Viroqua in June.
S. E. Sparling, Madison, Wis., secretary.

JULY.

The American Library Association will meet in Waukesha, Wis., on July 3, 1901.

The Vermont State Firemen's Association will meet at Bennington, Vt., July 17. E. D. Moore, Bennington, is secretary.

The Trans-Mississippi Congress will meet in Cripple Creek, Colo., on July 17-21.

Nebraska State Firemen's Ninth Annual Convention and Tournament will be held at Fremont, Neb., July 16-18, 1901.

AUGUST.

The National Firemen's Association meets at Buffalo, August 22-24, 1901. D. W. Gillen, 176 Monroe street, Chicago.

"Municipal Day" will be observed at the Pan-American Exposition, August 26, 1901.

League of American Municipalities will hold its annual meeting at Jamestown, N. Y., August 21-24, 1901.

New York State Firemen's Convention and Firemen's week at the Pan-American Convention August 19-24, 1901.

American Florists' and Ornamental Horticulturists' Association will meet in Buffalo, N. Y., on August 20-24, 1901. William J. Stewart, secretary, 67 Broomfield street, Boston, Mass.

The Pacific Coast Association of Fire Chiefs meets in its ninth annual convention at Tacoma, Wash., August 14-17.

The International Association of Fire Engineers meets in its twenty-ninth annual convention at Indianapolis, August 27.

SEPTEMBER.

The Glasgow Engineering Congress, Glasgow, Scotland, will be held in September, 1901.

American Public Health Association will meet in Buffalo, N. Y., September 17-20, 1901. Dr. C. O. Probst, secretary, Columbus, O.

The Virginia State Firemen's Association meets at Staunton, Va., September 25-26, 1901.

The New Jersey State Firemen's Association convenes September 9.

The Municipal Electricians will hold their meeting at Niagara Falls, September 2-4.

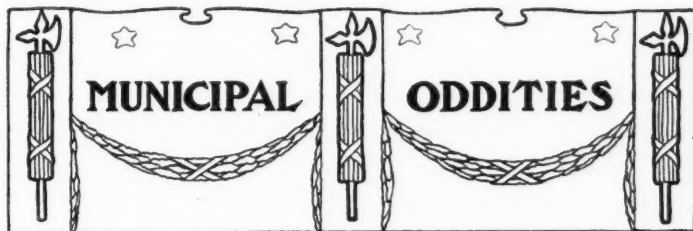
OCTOBER.

The International Cremation Congress meets in Buffalo, N. Y., October 1-3.

The American Society of Municipal Improvement meets at Niagara Falls, N. Y., October 1 to 4, 1901. D. L. Fulton, Allegheny, Pa., secretary.

The National Good Roads convention will be held in Buffalo in October.

Pennsylvania State Firemen's Convention and Tournament will be held at Philadelphia, October 1-4, 1901.



—The South Orange, N. J., Village Improvement Society has decided to rid that community of mosquitoes. To this end a committee on mosquitoes has been appointed. The committee recommends the abandonment of rain barrels, the screening of water tanks in houses and the placing of a thin layer of crude oil in cesspools of stagnant water where it is not practicable to drain them. The committee is also arranging for a free lecture upon the subject, to be delivered by an expert from the Department of Agriculture, Washington.

—The life of Mayor Burton, of Sioux City, Ia., has been made miserable of late over the location of a pest house for smallpox, or temporary detention hospital. Every location within the city limits has been tried and scores of objectors have come forward to give good reasons why it should not be placed in that particular spot, until the Mayor has been driven almost mad over the situation. The question bothered him so much that he dreamed about it nights, and one night he dreamed to some advantage. He dreamed that he saw one of the old Government barges fitted up with some discarded election booths, anchored out in the middle of the Missouri River flying the red flag. When he recalled this dream in the morning it struck him as a happy thought, and, subsequent investigation as to the possibility of carrying out the scheme and immediate action has resulted in a solution of the vexed problem, and now Sioux City has its smallpox Hospital located in the middle of the Missouri River where no one can object.

—A resident from the quiet neighborhood of Philadelphia took lunch with his New York cousin the other day at a French restaurant, and when he noticed snails were on the menu card he exclaimed:

"Do you mean to say that you eat snails?"

"Certainly," replied the New Yorker. "They are considered a great delicacy. Don't you?"

"Heavens, no! It would seem like cannibalism to me!" said the Philadelphian.

—Chicago is said to have one of the finest collections of birds in the country. It plumes itself on being the best place to study ornithology, and claims to have over 200 varieties outside of those in the common council chamber!

—Winnipeg has a police magistrate who has made a great record in his twenty years' service in the city, having disposed of 5,000 drunks in that time. The other day he went out with a friend from Vancouver to show him the sights of the town and partook too freely of the cup that inebriates. After seeing his friend safely housed in his hotel he started out on a little excursion all by "his lonesome," finally bringing up in front of the same hotel with a most beautiful jag on. He conducted a war dance, accompanying himself with sleep disturbing howls. The proprietor befriended him and put him to bed. The next morning, upon opening court, he called out, "Frank Courtright, stand up!" Then Frank stood up, tried and fined himself \$20 for being drunk and disorderly, and then remitted the fine owing to previous good behavior.

—In 1896, 1897 and 1898 the authorities of New York city, in an ungarded moment, killed seven cows which had ranged the grass-clad hills of Harlem and the Bronx for several years, because they had become so loaded with germs of tuberculosis as to endanger the public health. The owners made claims for heavy damages. After a year of negotiations no settlement was reached, and it was found that a special act of the Legislature would have to be passed before the bill could be paid. After red tapeism had had its inning, "cow bonds" to the amount of \$157.50 were duly issued by Comptroller Coler and sold to the highest bidder.

—A bill for the incorporation of Ridley, Tenn., has passed both houses of the Tennessee Legislature. It contains the following paragraph: "Thence north, 85 degrees east, to a blackgum marked with a cross and with mistletoe in the top, and with a bluebird sitting on a limb, which tree is a short distance east of 'Ed' Johnson's horse lot." The *News Banner* of Murfreesboro, Tenn., is a little concerned as to what will happen if the bluebird should become dissatisfied with his job as a boundary post and betake himself to other climes.

—Alderman Flack, of St. Louis, has introduced an ordinance to create a "Municipal Sport Commission." He proposes that this commission shall have charge of all forms of sport, so far as the city is concerned, be it horse racing, prize fighting, baseball or football. He believes that St. Louis can be made the centre of the sporting world with great advantages to the sporting fraternity. The ordinance creating the commission provides for compensation to the city of 10 per cent. of the gate receipts and purses, in lieu of free passes to city officials and employees.

—A group of boroughs in the northern section of London has just opened a Pleasure Palace which was purchased from a private corporation for a half million dollars. The private company sunk several hundred thousand pounds in various ways in connection with the scheme and was obliged to give up the project; hence the municipal control. The palace is surrounded by extensive grounds and is fitted out in the most lavish manner with amusements for the people. It has a museum which is permanent and also an arrangement by which it will secure a series of the rarest exhibits to be found in the United Kingdom for different periods during the year. This scheme will also include the exhibition of fine art collections also. There will be theatres and a round of amusements throughout the year, an industrial hall, a general auditorium with a seating capacity of 10,000, and there are beautiful gardens and conservatories. Special days for children and for the people will be celebrated, and, with the exception of fourteen days in the year, the admission will be free. On these particular days a small admission fee will be charged for the sake of helping defray the expenses. The theatre manager has already booked for the season, among other plays, "The Belle of New York," "A Trip to Chinatown," "Tom, Dick and Harry," and "Our Boys." Nothing in the line of a "problem play" will be engaged; everything will have to be of a popular order.

—Police Justice John J. Mahoney, of Chicago, gave a good repro-

duction of the judgment of Solomon not long ago. Two Germans had each other arrested on the charge of stealing a fine dachshund, which they both claimed. "That dog is mine!" said one. "I wouldn't take \$100 for him."

"He's mine," said the other. "I think more of that dog than I do of one of my children."

"One of you is mistaken," said the judge. "I cannot decide this matter. I will settle it by letting a policeman take the dog out and shoot him."

"All right," said one of the claimants, waving his fist in the face of the other man. "Just so you don't get him."

"No, don't kill the dog," shouted the other man. "He's too nice a dog to be ruthlessly shot. Let the other man have him; only I hope, your honor, that you will make a stipulation that he treats him right."

"The dog is yours," said the judge to the second man. "Take him home with you."



WALK NOT SAFE.—According to the Supreme Court of Michigan, where a flagstone in a sidewalk is broken, causing a depression of from two to five or six inches, it cannot be said that the walk is reasonably safe and fit for travel.

POLES AND WIRES have been condemned by the Common Council of South Bend, Ind. This progressive body has passed an ordinance requiring the removal of all poles from the business streets and the placing of all wires underground.

MUST SPRINKLE RAILWAY TRACKS.—The Council of Springfield, O., has passed a resolution requiring the City Solicitor to draw up an ordinance which will compel the Street Railway Company to sprinkle between its tracks and five feet on either side.

A MUCH-NEEDED REFORM is proposed by Philadelphia. It proposes to prohibit young girls, not yet in their teens, from selling newspapers or other articles on the streets. Such an ordinance is now before the councils, and its adoption is strongly urged by many citizens.

ELECTRIC RAILWAYS IN SAXONY show a rapid development. In 1899 there were 137 miles of tracks; in 1900, 166. There were 113,592,390 persons carried in 1899, and 147,645,690 in 1900. There were 721 motor cars in 1899 and 289 trailers, to 1,028 motor cars and 403 trailers in 1900.

CLOCKS IN STREET CARS are likely to be one of the summer's innovations in this line. The councils of St. Louis have passed an ordinance requiring the placing of a clock on each car, the object being to give the passengers a chance to correct the conductor when he punches the wrong time on their transfers.

CITY GOVERNMENT IN MANILA will soon be established, although Judge Taft says that for some time to come the officers will, of necessity, be appointed. The extension to other cities in the Islands will be made as rapidly as conditions will permit. The recent census of Manila by the Board of Health shows a population of 244,732.

THE TRANSMISSION OF ELECTRIC POWER a distance of 140 miles has recently been accomplished in California. This is considered the most successful feat of its kind in the history of electricity. The power is developed on the Yuba River, and transmitted 140 miles to and used in the city of Oakland. On a recent test 40,000 volts were transmitted without the loss of but 5 per cent.

NOVEL PUBLIC PLAYGROUNDS have been recommended by Mayor Perry, of Grand Rapids, Mich. He proposes to utilize all the vacant lots that are not under cultivation for the use of the children by paying the taxes on the property as a rental. In this way it will be possible to largely increase the facilities for playgrounds. Baseball, football, sandpits and similar amusements will be provided for the children.

TELEPHONE POLES IN CITIES.—The Supreme Court of Minnesota decides that a telephone company has the same right to erect poles in the city as upon rural highways; that the city has no authority to arbitrarily order the removal of such poles and wires. The city may, however, regulate the placing of poles, and, what is more to the point, compel companies to place their wires in sub-surface conduits when reason, convenience or good government so require.

THE BLUE LAWS OF OMAHA which have been enforced for some time past have been made inoperative by the action of Mayor Moore. The mayor said that, after a thorough trial, he had discovered there were more citizens in Omaha who favored the liberal policy—in other words and open town on Sunday—in the administration of the civic affairs than otherwise, and that so long as he remained the chief executive there would be no recurrence of Puritanical blue law enforcement.

LEGISLATED OUT OF OFFICE is the fate of the members of the police and park commissioners of Detroit, Mich., by a so-called piece of "ripper" legislation, which has received the signature of the Governor. The new law provides for a one-man commission for each of the departments, with the appointing power given to the aldermen. Another bill, of a similar character, legislates the present superintendent of public works out of office and gives the aldermen power to appoint his successor.

A REMARKABLE DECREASE IN VAGRANCY has been taking place in England during the past four years—so remarkable that if the decrease continues for the next four years, the workhouses in the eastern counties will shut up their casual wards, for there will be no tramps left. In Norfolk the total of 29,037 casuals in 1897 dropped in 1898 to 24,128, in 1899 to 15,095, and last year was only 9,739. The decrease spread over every union in the county. In Suffolk the figures for four years are 23,903, 22,385, 17,655 and 12,838.

STREET SIGNS AND HOUSE NUMBERS of a new and up-to-date manufacture have been provided for Harrisburg, Pa., by a recent ordinance of the councils. Fifteen hundred dollars have been appropriated for the erection of the street signs, but the householders will be required to furnish the numbers for their own houses. Many of them are already properly numbered in accordance with an ordinance passed some years ago. If the property owners do not comply with the provision within thirty days from the date of notification they will be fined not less than \$5 nor more than \$20.

THE BROOKLYN RAPID TRANSIT COMPANY at five of its car barns has provided clubs for the men, where they may have all the attractions of an up-to-date club—minus the bar. For example, there are eight billiard and pool tables; small game and reading rooms make the time pass pleasantly which otherwise might be spent unprofitably. Some of the rooms are fitted up with a stage, where concerts and vaudeville performances are produced most creditably by home talent. Hot coffee is served free at depots and large terminals whenever the weather is sufficiently cold, and in the heat of the summer cold lemonade or oatmeal water is given to the men.

ELECTRIC RAILWAYS IN GERMANY are being rapidly extended throughout the larger cities of the empire. On September 1, 1900, ninety-nine German cities had electric railways; on January 1, 1901, four months later, 107 cities were so supplied. In 1891, the number of such cities was three; 1895, thirty-two; in 1899, eighty-eight. The last year has witnessed large extensions of existing systems. There were 1,793 miles of track on September 1, 1900, as compared with 1,280 miles the year previous. The number of motor cars in 1899 was 4,504, and detached cars, 3,138, as compared with 5,994 and 3,962 in 1900. The aggregate power of the various stations was 75,608 kilowatts in 1900, as compared with 52,509 in 1899.

INTERESTING TELEPHONE STATISTICS are found in the last annual report of the Bell Telephone Company. This company and its branches now has 800,880 exchange stations and 1,961,801 miles of wire. Reports for 1900 show that Great Britain has 229,391 stations; France, 59,927; Switzerland, 38,864; Austria, 32,255; Russia, 31,376, and Norway, 29,446, the total for all Europe being a little less than 700,000 stations. The Bell Company took in last year \$9,300,000, \$1,873,000 more than in 1899, of which \$5,486,057 was profit. The independent telephone lines claim 1,500,000 subscribers, so that, even after

liberal pruning of these figures, it is seen that the United States has over three times as many telephone subscribers as the whole of Europe.

HOME DELIVERY OF LIBRARY BOOKS, as an experiment, is now being tried in Springfield, Mass. It is said to be the first time such a scheme has been attempted in this country, although it is employed in many English cities. One hundred persons have agreed to pay 5 cents a week for ten weeks for the delivery and collection of their books from the public library. The plan is for each of the 100 patrons to have a list of ten books at the start, and each is expected to have another list ready for the messenger on his weekly visit. All books can be kept two weeks, and, except some recent fiction, can be reserved for two weeks more. The messenger can renew all renewable books at the door. Supplementary lists can be sent in on postals.

GLASGOW HAS A SALOON TRUST, formed by many of the most practical reformers for the gradual introduction of the Gothenburg system. The town council, under the influence of total abstinence leaders and Conservative obstructionists, has declined to take up the question, but the "trust" is well organized and is applying directly to magistrates for licenses to enter the field and open a class of superior saloons which will improve the liquor traffic. This "trust" will be content with retaining 4 per cent. of the profits from the business and turning over the balance to the town treasury for charitable purposes. The object of this movement, which has the support of many religious and philanthropic men, is to mend rather than end the liquor traffic and also to break up the existing monopoly of the saloon business which has been created and rendered valuable by restricted licensing.

FACTS WORTH KNOWING ABOUT TOPEKA have been compiled by City Engineer Wise in his annual report, which was recently submitted to the Common Council. Topeka was laid out in 1854, incorporated February 14, 1857. Made the capital of Kansas in 1861. Its population, according to the census of 1890, is 33,608. Its elevation is from 880 to 980 feet above the level of the sea. Topeka has 128 miles of streets and 64 miles of alleys. The streets are 130 feet wide, and the alleys 16 and 20 feet wide. Topeka's sidewalks are generally 6 feet wide, of vitrified brick, there being 144 miles of sidewalk. The total area of the city is 4,250 acres. Of this area 3,061 7-10 acres are lots, 1,240 acres streets and alleys, 48.2 parks. The Topeka Railway Company has 30 miles of track and 66 cars, and is valued at \$750,000. The Topeka Water Company has 44 3-10 miles of pipe and the Excelsior Coke & Gas Company has 30 miles of pipes.

A CONFERENCE ON TRAMPS was held in Philadelphia the other day, by the mayors and burgesses of Pennsylvania's leading cities and boroughs. Conclusions were reached which will lead to important legislation the coming winter, and evil days are in store for the dusty traveler of the road who ventures to pass through the Keystone State. James A. Hamilton, of Chambersburg, told the following story:

"Three years ago we thought we had the tramp question in Franklin County settled for all time. We started out to make them work. We bought several hundred carloads of stone and had it hauled to the yard of the County Jail. We invested in a good many suits of blue jeans, and laid in a stock of hammers, and ran up quite a bill for provisions. Then we sent out after the tramps. We didn't have to send far; the woods were full of 'em—sent down, I suppose, from Scranton and Allentown. The whole county was interested in the project, and the first day of the experiment we had 600 to 800 people turn out to see the tramps work. We had a band of music, too, and altogether it was a great day. We had corralled thirty or forty tramps, and in the forenoon they worked first rate, but after the midday meal they complained of the food. In the afternoon they gathered in little groups of three and four and did a good deal of talking. Next morning after breakfast there was a strike. They wouldn't work, and we've never been able to make them work since."

ELECTRIC CARS ON BROADWAY.

THE Metropolitan Street Railway, of New York, accomplished one of the most remarkable feats in the change from one motive

power to another that has ever been known. At 7 o'clock on Saturday night workmen commenced to substitute the electric system for the old cable which has served for so many years, and before 11 o'clock Sunday night, May 26, the entire line from Fifty-ninth street to Bowling Green was operating with electricity.

The Madison avenue opening was a simple matter compared with that in Broadway. Here the engineer and workmen were seriously embarrassed by the remaining machinery of the cable road. The best anticipations of the engineers were distanced by the workmen with the result that cars were in motion over part of the route thirty-six hours ahead of time. Over one thousand men were employed on the work.

Some inquiry has been made as to what will become of the gripmen with the passing of their vocation. Not one of them will be thrown out of a job. For two months past the Broadway gripmen have, two or three times a week, been attending a school of instruction, where they learned the technicalities of the electric motor car, while they obtained practical experience by making runs at intervals upon trolley cars, under the guidance of motormen already broken in.

The electricians hardly expected to get the whole line working Sunday night, but they did it. The first electric car that went over the entire route started from Forty-second street at 10:50 o'clock Sunday night, and President Vreeland and other officials were aboard. The road is now mechanically complete and all cars are running on schedule time.

GAS PROFITS RELIEVE ENGLISH TAXPAYERS.

MANY of the English gas plants operated by cities are run on the profit-making basis, and not with the idea of selling the product at the lowest price consistent with maintenance expenses including interest charges and allowance for sinking fund. Although the average price of coal in English cities is much higher than the American product, the price per thousand cubic feet of gas is from 20 to 65 per cent. lower to the English consumer than to the American. The total net profits on the municipal gas works in England and Wales last year, according to a government report, amounted to £607,944. The capital invested in the plants exceeds £24,000,000, and the amount of capital paid up to March last was £5,700,000. The total revenue for the year was £6,280,000; the annual expenditure was £4,680,000, while the interest, annuities, sinking funds, etc., paid amounted to £1,000,000. In March there were 1,170,000 customers and 185,000 street or public gas lamps in use in the plants.

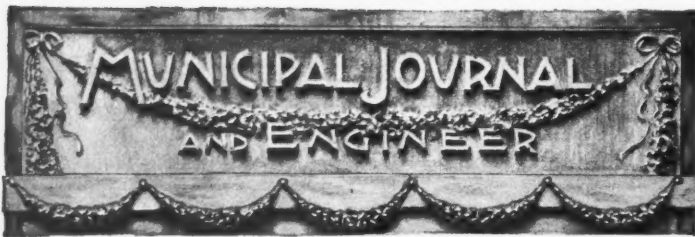
The following table gives the net profit made by some of the principal gas undertakings, and the amount which is available for the relief of the taxpayers:

Town.	Net profit.	In relief of rates.	Town.	Net profit.	In relief of rates.
	£	£		£	£
Manchester	73,965	52,000	Stockport	7,531	7,531
Salford	45,513	32,513	Middlesborough	5,931	4,228
Bolton	33,748	20,000	Barrow	5,187	5,187
Birmingham	29,821*		Darlington	5,981	5,981
Leicester	28,334	27,334	Coventry	5,021	4,000
Oldham	19,917	9,620	Macclesfield	4,880	2,440
Halifax	18,192	12,500	Batley	4,885	2,000
Burnley	14,356	9,500	Stockton	4,611	4,611
Wigan	14,078	14,078	Carlisle	4,513	4,513
Birkenhead	13,283	6,641	Huddersfield	3,433	3,433
Blackpool	13,203	11,931	Colne	3,518	3,518
Rochdale	13,061	13,061	Lancaster	2,609	1,250
Southport	10,324	9,000	Stalybridge	1,259	1,259
St. Helens	8,856	3,000	Heywood	1,768	1,000
Keighley	8,471	2,000			

* Improvement rate.

The plant operated at Widnes is particularly interesting. The charges per thousand cubic feet of gas are from 1s. 5d. to 1s. 7d., subject to a discount of 2d. for prompt payment, and are the lowest in the country. The municipality commenced operating the plant thirty years ago and the amount of indebtedness in March last was £69,000.

At the close of the last fiscal year there were 5,777 patrons, some of whom are located in outside villages, and over 900 lamps supplied. The total receipts for the twelve months amounted to £26,083, and the operating expenses were £19,416, while the interest on loans was £1,784, sinking fund £1,068, which left a net profit of £3,815. The illuminating power of the gas supplied by this plant is 18.5 candle power, or 4.5 candle power more than is prescribed by the Corporation's Act of Parliament.



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EDITORIAL COMMENT

A THREE-CENT car fare is in the air. The people demand it and city officials will do well to heed the demand, for what the people ask for they get, sooner or later.

CASH prizes are being offered in some of the smaller cities for the most attractive dooryards, front and back, by the daily newspapers. This method is sure to be effective in promoting civic beauty.

THE councils of Philadelphia are considering an ordinance which prohibits "the vending of flowers, matches and newspapers, or any other articles, by girls under the age of sixteen years upon the street." It is the moral duty of every city to adopt a similar measure.

THE Municipal Assembly of New York city has passed an ordinance prohibiting the Metropolitan Street Railway Company from allowing passengers to stand between the seats of an open car. This is commendable. Let it go a step further and compel the company to provide an adequate number of cars to meet the demand of the service.

MAYORS who are elected by the people, as opposed to those elected by party machines, seem inclined to shatter many idols which have long been worshiped and bowed down to by a fearing public. For instance, the familiar signs—"keep off the grass"—have been banished from the parks of Cleveland and Toledo, by Mayors Johnson and Jones. Cities would turn out better citizens if they would have more grass for the youngsters to play on who are soon to become citizens.

It was refreshing to note the promptness with which Mayor James H. Blessing dealt with the recent street car strike in Albany. He is no invertebrate. While some lives were lost and property damaged, a much greater disgrace was avoided by prompt action. The call for military aid was justifiable, if for no other reason than to prevent a recurrence of the disgraceful scenes which were enacted in Cleveland and St. Louis last year, largely on account of the dilatory action of the mayors of those cities.

THE New York Legislature, at its last session, passed a law making fire drills compulsory in public or private schools or educational

institutions, colleges and universities excepted. It places the responsibility for carrying out the measures upon the principal or person in charge, and imposes a fine of not more than \$50 for failure to comply with the regulation. Such drills are to be held at least once each month. A similar measure should grace the statute books of every state. "An ounce of prevention is worth a pound of cure."

PARTISAN politics wins the day in the decision which has been rendered by the Pennsylvania Supreme Court in the contested bill which provided for a change in the method of governing the three cities of the second class—Pittsburg, Allegheny and Scranton—by the election of a Recorder instead of a Mayor, inasmuch as that judicial body pronounces the law constitutional. It was not a unanimous decision, for three of the judges filed a dissenting opinion. Regardless of the correctness of the majority decision it is a blow to the principle of home rule, which, no doubt, the municipal reformers of Pennsylvania will take good care is not violated in the future, by securing proper legislation at an early date. The bill was aimed at the "insurgent" wing of the Republican party of Pennsylvania, by the "Boss" as a punishment for the late Senator Magee, who was alive at the time of its inception. That its passage was possible is a blot upon the honor of the Keystone State.

BURY THE LIVE WIRES.

THERE is only one thing to do with the wires which spread like a great web over the modern city—bury them. The conduit is an absolute civic necessity. The authorities who do not realize this should be allowed, at the next election, to rest from their labors. The presence of these wires strung on ungainly looking poles overhead is a constant menace in case of fire. So long as they remain where an accident may toss a "live" wire to the street, or by crossing a telephone or telegraph wire send a deadly current to some unsuspecting victim, so long is human life endangered. The civic authorities who permit this condition to continue with simply a lame protest are guilty of neglect.

The thing to do is for the city to construct, maintain and operate the conduits, obliging the private corporations to pay a rental which will be sufficient to meet all necessary expenses, including interest, depreciation and sinking fund provisions.

FRANCHISES HAVE REAL VALUE.

FRANCHISES are not without value except when they are to be granted or taxed. Such is the apparent belief of the corporation owning them. When the privilege is to be sold by the corporation quite the contrary is true. To resort to the petty tricks to evade the payment of a tax upon the value of a franchise is but hastening the day of reckoning and laying up wrath against judgment to come.

To the unprejudiced man the justice of a franchise tax is apparent. To defend the other position is absurd. The courts have so decided in favor of a corporation which sought to realize on its value when reselling to a city when it had received the same franchise from the same city without money and without price. The levy of taxes upon such franchises, assessed at a fair valuation, means only that the companies owning these franchises shall be required to pay a tax upon their most remunerative piece of property. The fact that the property comes from the municipality itself, and that it is the municipality which makes the franchise valuable is an additional argument in favor of a fair tax being assessed against it, if any argument is necessary.

The equity of a property tax being conceded, no argument is necessary to convince intelligent men that a franchise tax is just and proper, for it is no longer seriously contended that a franchise is not property. Anything that has value, and may be controlled by an individual or a corporation, is property and should be subject to a tax as such. The fact that franchises change hands for large sums is quite conclusive of their value.

The failure of the general public, and the citizens of our cities particularly, to realize and insist upon this simple fact earlier, has resulted in the gift of millions of dollars to mere franchise-hunters, who, by political pull, or more reprehensible means, secure franchises for nothing, and then sell them to others for thousands, and even hundreds of thousands of dollars. At the same time the public treas-

ury is deprived of large sums that it should have received from franchise taxes.

With recognition of the fact that franchises are property, however, a more business-like course is being followed in franchise granting. As in every growing city, franchises increase in value very rapidly, it is now customary to limit their terms to comparatively short periods, and to demand a *quid pro quo* from those to whom the franchises are granted. This is the policy now pursued in nearly all the larger cities and in many of the smaller ones. A less progressive procedure on the part of civic authorities in granting a franchise is antiquated and open to suspicion.

CIVIC ARBORCULTURE.

WITHIN the last decade civic arborculture has made a long stride toward gaining the general approval of the public. The village or city improvement society has multiplied its numbers, and, be it said to its credit, is leading in the cause of tree planting. No city or village should be without some organization which takes particular interest in the promotion of civic beauty by the planting of trees.

The question as to who should own and care for the trees—the city authorities or the property owners—is still undecided. The State of Massachusetts has a special law of recent date placing the trees under civic control. This is the rule in most European cities as well. It is only within recent years that the city has recognized the value of the tree to the community, and the general public is not inclined to quarrel over the question of ownership so long as the tree is protected and its culture promoted.

The city of Washington has about eighty thousand trees which are under the special care of a tree commission. Similar commissions care for the trees in the State of New Jersey, Savannah and other Southern cities. Indianapolis has a civic Arbor day society, which is popular and highly efficient in promoting arborculture. Other cities have similar societies, while some cities place the trees in charge of the Park Department or a single officer, commonly called the "city forester."

The time has come for civic authorities to recognize that a tree has a sanitary, æsthetic, moral and physical value to the urban community and that, therefore, no effort should be spared to preserve the trees already planted and to materially increase the total by annual planting. Many states have arbor days, and there is no reason why the city should not have a civic arbor day, making strenuous efforts to arouse the enthusiasm among the school children everywhere, as is already done in a few cities.

THE PAN-AMERICAN EXPOSITION.

THE citizens of Buffalo have every reason to be proud of the achievement they have made in the conception and execution of the plans for the Pan-American Exposition.

It required much courage to embark on an enterprise involving an outlay so extensive and an expenditure of energy so vast and immeasurable. Only those who have actually been engaged in the work of planning and bringing to completion the Pan-American Exposition can realize the extent of the labors which this has involved. Since the project of holding such an Exposition was revived in the fall of 1898, at the close of the Spanish-American war, which temporarily put a quietus on the movement and compelled its postponement from 1899 to 1901, there has been a ceaseless effort to advance the interests of the enterprise.

To put the project upon its feet necessitated, in the first place, the inauguration of a movement to unify the citizens of Buffalo, and especially the business community, in support of the Exposition. When they were appraised of the broad character upon which it was planned to hold the Exposition, the business men came to the front nobly, as the grand feat of raising a million dollars in subscriptions to the stock within one week showed. Buffalonians are not slow to back home enterprises when they feel sure that they are entitled to their support. The raising of the funds necessary to give the enterprise a substantial footing was followed by efforts to obtain appropriations from the State of New York and other states and countries of Pan-America, and this involved long and often wearisome

efforts on the part of those whose interest in the matter was simply that of Buffalonians striving to make a success of a project beneficial to the community as a whole. Fortunately these efforts were crowned with success, and the enterprise moved along, once it was started, with gratifying promptitude.

The organization of the Exposition and the engagement of men to carry on the work of construction, collection of exhibits, publicity, etc., was conducted in a manner most gratifying in its results to the people of Buffalo, and should redound to the credit of Buffalonians and the country at large.

No exposition has ever been constructed within so short a time or in such a substantial way. No exposition has ever been planned and carried to completion with so little friction between those engaged in the work. To this fact is largely due, no doubt, the circumstance that so satisfactory results in every department have been achieved. No exposition of the past was in a condition of completeness equivalent to this at a corresponding period in its history. No exposition of the past was ever constructed with so little dissatisfaction on the part of the directors and stockholders with the manner of its construction and the work done by all concerned in its creation.

I believe it is generally admitted that no exposition of the past was ever so effectively and judiciously advertised as the Pan-American has been through its department of publicity, which made use not only of all kinds of advertising, but of the columns of the magazines and the leading newspapers of the country, to an extent never done before, and all this without the expenditure of a single penny for space advertising.

Ground was first broken for the Pan-American Exposition in September, 1899, but it was not until June 4, 1900, that the first timber was raised aloft as the beginning of the superstructure of the first building. Within that period of only eleven months the splendid city of more than one hundred buildings sprang into existence, and the work was all done in so substantial a manner that, so far as construction is concerned, the buildings are fitted to last for many years to come.

The exposition has been opened with every prospect of a successful career, and its results promise to be of the greatest possible permanent benefit, not only to Buffalo and the Empire State, but to the United States and to all the countries of Pan-America.

CONRAD DIEHL.

A PLEA FOR THE "CITY BEAUTIFUL."

THE Municipal Art Society of New York is prospering and doing its best to improve its opportunities. The inquiries that reach me, however, suggest conflicting views as to our object. One is that it is to get the city to help art; the other, that we hope to induce the city tastefully to beautify itself. The latter is the correct one. With all deference to art, this society, as such, has no interest in it whatever, except to make it serve the city's welfare. Our point of view is, every time, that of the city's interest.

Two questions are so frequent as to deserve special answer: One, whether the Fine Arts Federation is not already doing our work; and two, whether the Municipal Art Commission has not made it superfluous?

As to the former: the Federation is composed of ten societies, nine of which are specially devoted to art interests, and one—our own—to city interests. Of course, they are not other than public spirited, and we hope we are not other than artistic. But our society is thus the link between the great interests of art in its different lines and what we consider the far greater interests of the public in getting the most service possible from art.

As to the latter: the Art Commission is precisely what we are not—and vice versa. It is an expert body sitting as censor upon propositions offered by others, and has no right of initiative. Our society assumes no qualification to criticise beyond that of every other citizen; and we aim to initiate and present in practical form such propositions as shall at once best serve the city and commend themselves to the good taste of the Art Commission.

It has been our custom each year to promote the single piece of art work that seems most timely and practical. This will be con-

tinued. We propose to devise how, with least expediture, most of beauty and interest can be added. For example, where millions of dollars have provided park surroundings or attractive vistas; a statue, a fountain, a clock tower, or an artistic electrolier, appropriately placed, at comparatively petty cost, may be the one thing needed to complete the scheme, emphasize the needed focus, and make effective the hundredfold greater expenditure already had.

As we understand it, art is not a thing, but rather the right way of doing whatever one has to do. The principal aim of the Municipal Art Society is to assist the city in obtaining the most artistic results; this generally means finding the most effective as well as the most economical way to do what in any case must be done.

Street corner signs and house numbers can be so made as clearly to inform every passer-by, without disfiguring either the landscape or the house. Street lamps, police and fire alarm boxes may be made dignified and artistic fixtures. The society has a committee detailed for this work which is giving the subject vigorous attention. When the city has spent millions of dollars for a park, and its citizens other millions on residences fronting it, consistency and true economy, even more than art, demand appropriate park entrances. We propose to take hold of the business sign question as well, and have appointed a committee to represent us in working to secure decent, appropriate and even beautiful business signs.

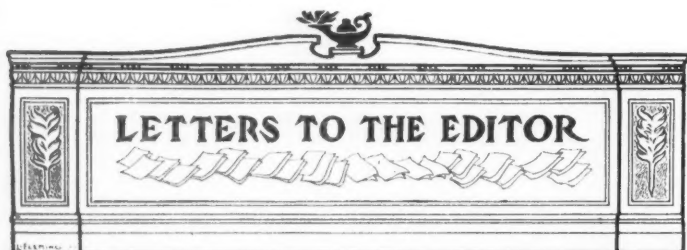
Again, we are doing our best to be an Art "Get Together" Club. Not merely with our sister societies in the Fine Arts Federation of this city, but those outside, such as the Society for the Preservation of Scenic and Historic Sites and the City History Club, do we propose a harmonious co-operation; but it is our intention to extend our acquaintance to similar organizations in other cities, and thus secure not merely inter-city, but in a measure an inter-state and international scope for our work.

To this end we have appointed a committee to arrange for a Municipal Art Exhibition, to be held in this city as early as proper preparation can be made—we hope by December next. This exhibition will afford an opportunity for all interested to see the progress which of late has been made along strictly practical lines of public art, utility, convenience and comfort. Moreover, it is proposed, by competition and other means, to develop and exhibit novel features peculiarly characteristic of, or adapted to local conditions.

New York is the first city in the world in annual development, public and private, and far the most lavish in her expenditure thereon. For this reason, New York City should set the pace which others follow. And we maintain that into this growth shall go as much good art as there is put good cash; or, in other words, that the funds used shall be expended as effectively as possible for the city's beauty and convenience.

We expect to succeed, not from any great opinion of our power as a society, but because we believe the opportunity so great and our citizens awake to it. By the time New York is the greatest city on earth it ought to be the most beautiful. Its wealth and natural advantages are such as to make this easy of achievement. But the time is short in which to work if this is to be done.

JOHN DEWITT WARNER, President.



ARE MUNICIPAL WATER PLANTS SUCCESSFUL?

Caldwell, N. J., May 27, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

My town contemplates putting in a water plant on the municipal ownership basis. Can you advise me of any publication that will give information as to the success of similar plants in other towns?

JOHN ESPY, Mayor.

There is no work which is devoted wholly to the subject of municipal water works but there are several volumes devoted to the general question of public ownership which you would find of value. "Municipal Monopolies," by Edward W. Bemis, price \$2, has a chapter on water works by M. N. Baker, which is worth the price of the book; some valuable suggestions will be found in "Municipal Public Service Industries," by Allen Ripley Foote, price \$1; "Municipal Government in Great Britain" and "Municipal Government in Continental Europe," by Dr. Albert Shaw, price \$2 each, might be helpful.

About 70 per cent. of all the water works in the United States are owned and operated by the city, and it is generally conceded, even by the opponents of public ownership, that there are greater possibilities of success in this particular field than in any other. The first requisite to success in the construction of a water works system is the employment of a reliable engineer to select the source of supply, and make designs and specifications. A second is to appoint the best qualified men in the city, without regard to politics; and the third is the employment of skilled superintendent and subordinates, making their tenure of position depend wholly upon their efficiency.—[Editor.]

WANTS REGULATIONS FOR EXPLOSIVES.

Allegheny, Pa., May 21, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

I desire to prepare an ordinance regulating the storage, handling, etc., of high explosives in this city for the action of our councils. While the matter was being canvassed in my office your representative was present, and he suggested that I write you for information on the subject, stating that you would take pleasure in forwarding the desired information. Accordingly I avail myself of the kindly suggestion and request, if within your power, that you furnish me with information as to what explosives, in your judgment, should be wholly prohibited, and what should be simply regulated, and if possible, the means by which they may be regulated.

ROBERT DILWORTH, City Clerk.

The desired information was sent to Mr. Dilworth upon receipt of his question, but it did not include the practice of all cities, and, doubtless, there are many varying ordinances governing the use and storage of high explosives within city limits. If our readers will send the regulations in use in their cities we will be glad to forward the same to Mr. Dilworth and also point out in a succeeding issue the novel or unusual methods employed elsewhere.—[Editor.]

SOUTH NORWALK LIGHTING PLANT.

South Norwalk, Conn., May 14, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

The article in your May issue relating to the South Norwalk municipal electric light plant is most interesting, and I am indeed truly grateful for the kindly spirit exhibited in it toward me.

Knowing that it was beyond doubt the intent of the writer of your article to be accurate, it is quite probable that the few errors in his figures and conclusions may have been due to the limited time he was able to devote to his investigations when this plant was honored by his visit; therefore, I feel you will accept in the same good will in which it is written and give space to it in your excellent journal, a statement of facts from the pen of the designer and manager of the plant mentioned, which if omitted may leave open to perplexing contrast certain statements in your article more or less misleading to many of your readers interested in municipally owned electric lighting plants and also detract from the fine reputation of this particular one, which is so widely known.

In your article it appears that the price paid to its municipal plant by the city of South Norwalk per year per arc lamp for street lighting was \$66 for 1:30 a. m. service, and was raised to \$72 for all night service at the beginning of the year. The price of the former should have read \$60 instead of \$66, and it should have been stated, as explained to your representative, that though the all night rate was fixed at \$72 per lamp per year, it was reduced to \$66 after the second month.

This rate, according to official public lighting statistics, is quite low for all night arc lighting, the lowest in fact that I have any knowledge of when it is remembered that it also covers the cost of maintaining and extending the city's fire alarm system—an expense to the plant varying from \$350 to \$500 per year,—which cost, if deducted, reduces the lamp ratio to about \$62. Further than this, as the city's poles are located in about every street they afford a great convenience to the telephone company, for the use of which it gives the city the free use of several telephones and 50 per cent. reduction from regular rates on all other telephones for municipal service. This saving, amounting to perhaps \$200 yearly, if also deducted from the lamp ratio, it drops to about \$60; and again, if the profit of \$6 per lamp per year (low estimate) is taken from this last figure it will then be seen that the actual net cost to the city per year per arc lamp is pretty close to \$54 for all night service, covering interest and all operating expenses.

As the writer of your article is probably as familiar with the Ohio plant as he is with this one, I would like to ask if it is operated by steam and was it substantially built with an eye to future growth upon valuable property within 2,000 feet from the centre of its lighting district as is this one? It is not necessary to calculate what this plant is actually worth, but it may not be out of the way to say that overtures have been made by a private corporation and ignored by a unanimous vote of its citizen owners, to purchase their plant at double its cost. Does this indicate too much cost in building?

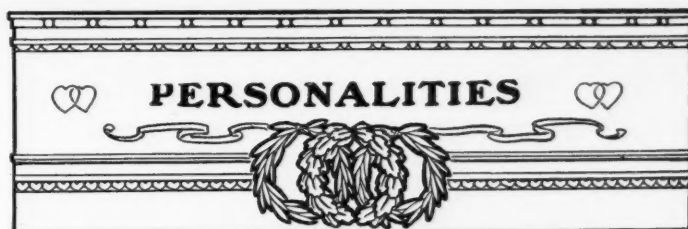
As to the number of men employed, may I ask if the Ohio plant with four men has the entire charge of its collections, rate making, expenditures, orders and bookkeeping? Does it draw up all of its own plans, designs and specifications without any outside engineering help? Does it supply immediate response to emergency calls of 150 and upward patrons and inspect twice daily each one of its 103 street arc lamps, once during the day and once after they are lighted, assume the entire charge and cost of the city's fire alarm system, operate 500 horse-power of boilers, engines and dynamos under load on an average of nearly fourteen hours per day, make general repairs to same and keep in order twenty-five miles of distributing circuits? If the Ohio plant does all this with four men they must indeed be kept pretty busy. It takes seven men ten to eleven hours a day and seven days a week to do it for this plant. If they are enjoying the city's "liberality," they are not saying much about it.

I do not like to boast, though some boasting had to be resorted to for the purpose of refuting some things that your article said which did not fit this plant at all, and I would be most pleased to have your representative make it another visit and be convinced.

A. E. WINCHESTER.

We are glad to give space to the above correction because it helps to emphasize the position of THE MUNICIPAL JOURNAL AND ENGINEER upon the question of municipal ownership. The one error made in the article in our May issue about the plant at South Norwalk was in an unwitting statement about the price of the arc lamps per year, which Mr. Winchester has corrected. The position of this journal, as has been stated many times, is one of an unbiased judge with predisposition, if any, in favor of public ownership, we therefore feel at liberty to speak frankly. We do not hesitate to say that a plant is an unqualified success when the conditions warrant such a statement; nor, on the other hand, can we refrain from saying that a plant is not such a success if, on inspection, it is not found to be such. For this reason the modifying statement was made about the South Norwalk plant.

Thinking that a possible error had crept in, the writer of the article went over the subject again, including the annual report of the commissioners and the other data gleaned from Mr. Winchester, with an expert engineer and no reason was found for altering the mild criticism which appeared in the description of the plant in our May issue. It is still possible that the conclusion may be in error, as we have not seen the bills and vouchers showing the actual cost of the equipment, etc., which might modify our conclusions somewhat. The plant to which we referred in Ohio will be shown up in a future number, when a more careful comparison between the two plants will be made.—[Editor.]



—Mr. Richard J. Barr is the new Mayor of Joliet, Ill.

—Mr. H. C. Berghoff has been elected Mayor of Fort Wayne, Ind., on the Democratic ticket.

—Rumors are still current that Comptroller Bird S. Coler, of New York will not be a candidate for Mayor at the approaching election.

—Mr. L. F. Boyd has been elected City Clerk of Spokane, Wash., for the sixth term. His election has been unanimous every time with the exception of the first.

—Mayor James K. McGuire, of Syracuse, announces the fact that Mrs. Russell Sage, of New York, has signified her intention to construct and equip an old men's home in that city.

—While riding in the Bronx Park on the 26th instant, Street Commissioner Percy Nagle, of New York, was thrown from his horse and his right leg was broken below the knee.

—In the Parker-Hughes Mayoralty contest in Topeka, Kan., which was taken into the courts, Judge Hazen of the District Court decided in favor of Parker. Hughes has asked for a new hearing.

—Mrs. Margaret Robbins was recently unanimously elected the treasurer of Idaho Springs, Col. This calls attention to the fact that there are now eight women treasurers of as many cities in Colorado.

—Mayor Harrison, of Chicago, has appointed a new chief of police to take the place of Chief Kipley, resigned. The new appointee is Frank O'Neill, who is looked upon as a capable officer, and who has had long experience in police matters.

—Mr. E. Z. Simmons is building an emergency hospital in Kenosha, Wis., at a cost of \$30,000. The hospital is a gift to the city. Last year Mr. Simmons gave to the city a \$100,000 memorial library, and a soldiers' monument costing \$10,000.

—Mayor Jones, of Toledo, continues to practice the "Golden Rule" of which he is so ardent an advocate. The other day he came to the rescue of the city and gave his check for \$10,573 to meet an indebtedness which had not been provided for by the Aldermen.

—Mayor C. Brooks Johnston, of Norfolk, Va., has resigned to accept the active management of the Norfolk Railway and Light Company's properties. Nathaniel Beaman, president of the Bank of Commerce, and vice president of the Common Council, was unanimously chosen by the Councils to fill the vacancy.

—Mr. Harry Hamlin, a famous horseman and millionaire society leader of Buffalo, N. Y., and Mr. Charles R. Huntley, general manager of the electric light plant of the same city, have been sworn in as special policemen to serve during the Pan-American Exposition. It is said that many other wealthy people and society men are to follow their example.

—According to a press dispatch Mayor McKee, who was recently elected Mayor of Logansport, Ind., has been asked to resign on account of his drinking habits. He is a dissipated man and was known to be such when he was a candidate for re-election. He seems to have regarded his second election as a warrant for breaking all bounds; hence the request for his resignation.

—Mayor George R. Perry, of Grand Rapids, Mich., in his annual message, advocates in strong terms the abatement of the smoke nuisance, but in connection therewith called attention to the fact that the municipality was also an offender, and until the chimneys of the public buildings and schools ceased to emit black clouds of smoke others could not be expected to put forth strenuous effort to correct the evil.

—Mayor Holden, the newly chosen chief executive of Zanesville, Ohio, surely has the courage of his convictions, which, in itself, is a valuable quality. He believes there is no harm in the wide open saloon, either on Sunday or any other day, nor in slot machines;

therefore he advocates both with an openness that is startling to the good government people, who ran a third candidate and made the election of Holden possible.

—Mrs. Potter Palmer has been asked to enlarge her field of usefulness and become the volunteer inspector of streets and alleys in the precinct in which she resides. While she has not given a definite answer, yet it is believed that she will accept. It will be her duty to make frequent trips through the streets and alleys of her precinct, investigate the garbage boxes, see that every house is provided with metallic cans for ashes and waste, and urge in general the enforcement of the municipal cleanliness ordinance.

—Hon. Chauncey M. Depew has informed Mayor Henry H. Lane, of Peekskill, N. Y., Mr. Depew's native town, of his intention to provide a public park for the city. The land which it is expected the Senator will deed is a part of what has for fifty years or more been known as Depew's woods. It comprises 100 acres. The whole piece lies within the corporate limits of the village and is admirably situated for park purposes. With slight expense it can be made a beautiful spot. A stream of water runs through it and there is an admirable place for the construction of a lake.

—City Electrician Ellicott, of Chicago, is now endeavoring to solve the problem of producing steam from the incineration of garbage in a small plant which consumes the collections of four square miles. He has been able to maintain a steam pressure of eighty-five pounds for a short period of time, but the unevenness of the garbage and its lack of classification has made it impossible to keep it up to that figure. The experiment has been sufficiently successful to indicate that, under proper conditions, the feat could be accomplished of maintaining an even pressure of steam at all hours as is done in English cities where garbage is carefully classified.

PUBLIC UTILITIES

LOFTY AND BEAUTIFUL WATER TOWER.

DURING March, 1897, ground was broken in Reservoir Park, on Compton Hill, St. Louis, Mo., for Stand Pipe No. 3, which is said to be one of the highest water towers in the world.

It is one of the prettiest of its kind in the country, and is built chiefly of red pressed brick, with granite and white stone trimmings, and the cost when completed November 30, 1899, was \$54,930.

The water tower, unlike the other two in the city, has two stand pipes, consisting of a small and a large tower built into each other. It is 199 feet high to the top of the flag-staff, which ornaments the point of the roof, and the exact height to the top of the minaret is 179.5 feet.

The base is 30 feet square. The first 40 feet is built of stone, and the remainder of red pressed brick, with occasional stone trimmings, to afford a relief to the eye, and increase the beauty of the structure. The iron work is 140 feet from above the foundation.

At the top is an observation room with a roof of stone and copper, coming to a point. The large tank is in the middle of the large tower and is 6 feet in diameter. A flight of steps wind around it from the ground to the observation room. The small tower, which is built directly into the other on the left-hand side, contains a stand pipe two feet in diameter.

The tower is located just west of the Compton Reservoir, and is 100 feet from Grand avenue.

From the ground to the entrance leads a flight of highly ornamental stone steps. Every few feet up the stairway in the tower is a small window to light the interior. In night time incandescent lights perform this service. Above the observation room are four arc lights, one on each side.

At the top of the large and small pipes is constructed a cross pipe. The large pipe is a shut-off valve for the high pressure service. When too much water is being pumped into the high service system,

it is forced up the large pipe to the top, then across to the smaller one and through it into the reservoir.

The small pipe is directly connected to the reservoirs, and the water in it is always on a level with the water in the reservoir.

At the bottom of the two pipes there is a connection with shut-off valves. In case of an accident to either system the valves can be opened, and one system can supply the other.

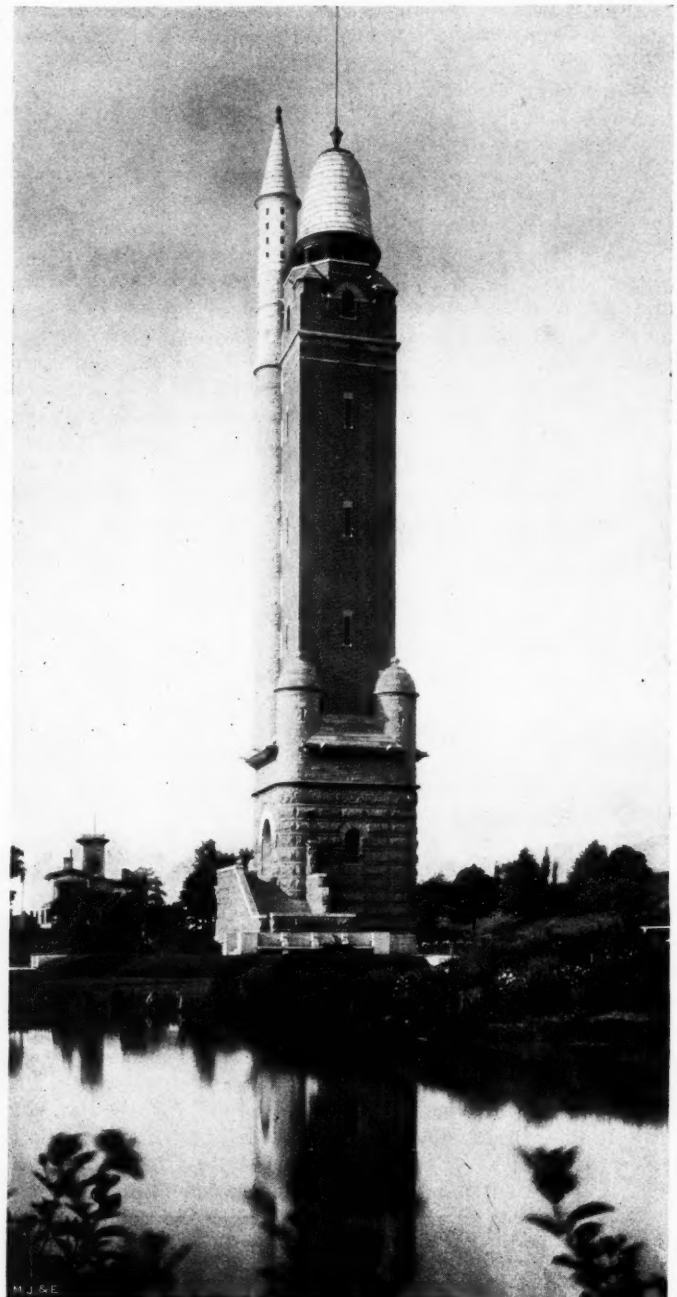
The high power service includes all the high points, and the water is obtained through the Baden Water Works.

The Bissell Point Works supply the low service system at Baden.

In case of a second alarm of fire, before the tower was built, it was necessary to increase the pumping service, but now all that is necessary is to connect the two systems under the tower by turning a valve. The water is then drawn slowly from the large stand pipe, and no extra pressure at the pumping station is needed.

The new tower was entirely completed November 30, 1899, but was put into partial operation four months earlier.

In October, 1899, the work of beautifying the grounds about the stand pipe was begun. Old driveways were changed, new foot paths laid out, the grounds were graded, terraced and sodded and a small lake formed south of the tower, which, with its surroundings, is

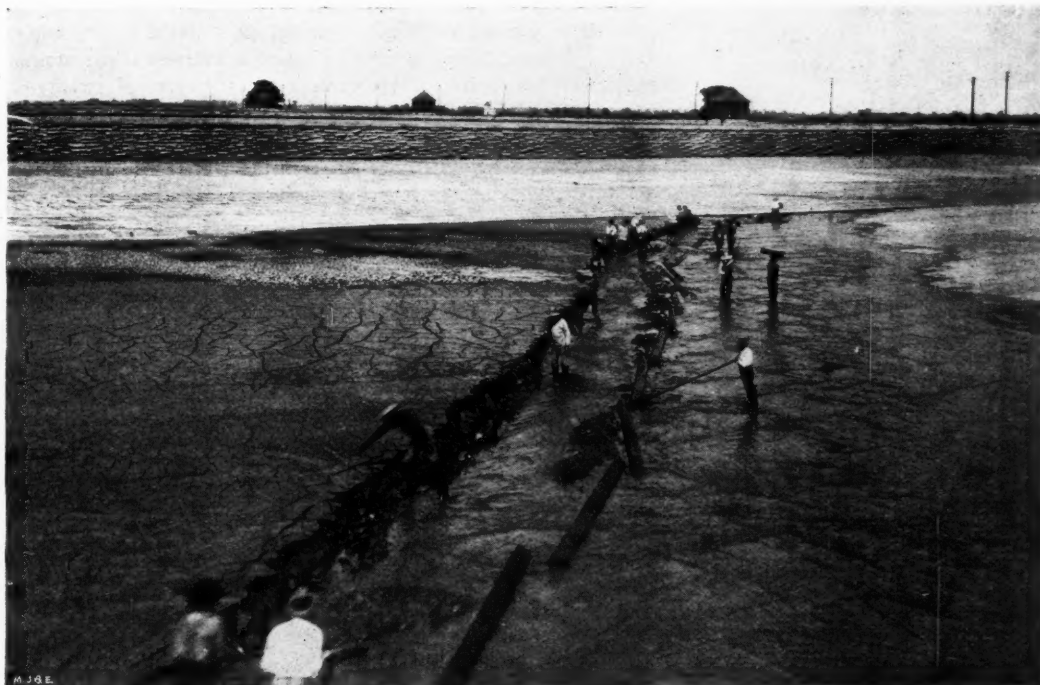


ST. LOUIS WATER WORKS—WATER TOWER.

now one of the most attractive sights in St. Louis. The whole cost of the work was \$6,735.

The expenditure for operating and maintaining the water works department for the fiscal year ending April 1, 1900, taken from the last report made, were as follows:

Expenditures	\$512,956.41
Receipts	23,059.79
Net expenses for operating and maintaining works	\$489,896.62
Extension of works	653,725.68
Total expenditures for maintaining and extending the works during the year	\$1,143,622.30



ST. LOUIS WATER WORKS—SHOWING METHOD OF REMOVING SEDIMENT FROM SETTLING BASINS.

Maximum daily consumption of water April 1, 1899, to April 1, 1900, in millions and tenths of United States gallons, 60.6.

Maximum daily consumption, 79.7.

Minimum daily consumption, 43.6.

Total consumption, 22,113,679,000 gallons.

Cost of pumping per million gallons, new system, low level, high service, 8,008; low service, 2,453.

High service, 6,102; low service, 2,453.

Number of gallons per year used per capita on a population of 687,000, 33.005; cost per thousand gallons, .051 cents.

The total amount of sediment deposited in the basins during the year was 317,000 cubic yards, of which 248,000 cubic yards were removed by manual labor at a cost of \$3,715.90, or .0149 per cubic yard.

The report for the fiscal year ending April, 1901, has just been published, and some of figures are interesting in comparison with those of last year's report. Some of the items follow:

Total amount furnished for year ending April, 1901, 22,993,669,000 gallons.

Total receipts from above, \$1,607,168.82.

Average price per 100 gallons, 7.1 mills.

Amount furnished through meters, 4,401,632,000 gallons.

Receipts from above, \$620,723.00.

Price per 100 gallons, 1.41 cents.

Amount furnished direct, 18,592,037,000 gallons.

Receipts from above, \$986,445.82.

Price per 100 gallons, 5.3 mills.

WATER WORKS PEOPLE IN NEW YORK.

THE twenty-first annual convention of the American Water Works Association will be held during the week beginning June 17 in New York City, Borough of Manhattan. The meetings will be held and

exhibits shown in the Murray Hill Hotel, an ideal place for the headquarters of an association, the majority of whose members do not reside in New York. The hotel is barely a minute's walk from the Grand Central Station and a convenient center for excursions in every direction to points of interest in and about the metropolis. The Managers of the Association have planned not only to make the convention one of great interest from a professional point of view, but also to make the sojourn of a week in New York during a season when the city is at its best pleasant and entertaining for the delegates and their guests.

Engineers, superintendents, commissioners and all others interested in the subject of water works, or those who seek advanced

knowledge in subjects of vital interest and importance to the institution, construction and maintenance of a thoroughly modern system of water supply, will be welcomed at the meetings of the association. These will be devoted strictly to the discussion of subjects connected with water works. Papers will be read by engineers and specialists of wide reputation and acknowledged accomplishment. The papers will be followed by discussion, and pertinent questions will probably elicit information and ideas which otherwise would pass without comment. For this reason everyone who has some problem to solve or who seeks information upon some particular subject is asked to be prepared to lay his question before the meeting. From the papers and discussion by men who are daily meeting the practical problems of water supply much valuable information may be obtained, and municipalities and companies who are con-

ducting water works will do well to see that their representative attends the convention.

As to the expense of attending the convention, Peter Milne, secretary and treasurer of the association, gives details in circular sent to members. The rates at the Murray Hill Hotel are: American plan, \$4 per day; European plan, single room for one person, \$2 per day; room for two persons, \$3 per day. It might be added that in the vicinity of the Murray Hill are good restaurants, where excellent meals may be obtained at a variety of prices, which will fit the pocket-book of any one.

In regard to transportation, arrangements for a fare and one-third on the certificate plan has been made with the railroad companies. Tickets at full fare may be obtained within three days (exclusive of Sunday) prior to and during the first three days of the meeting, that is, between June 13 and June 19. The purchaser of such ticket, which should be bought at least thirty minutes before the train which he is to take leaves, will receive upon request a certificate which will be given to Secretary Milne at the meeting. The agent of the Trunk Line Association will be on hand to validate certificates on June 20, upon or after which date holders of validated certificates may exchange them for return tickets and receive a two-thirds reduction. Unless the attendance at the convention reaches 100, the certificates will not be validated, and the full fare on return will be charged. The two-thirds reduction may be obtained, if the necessary minimum is in attendance, up to June 26.

Those who desire space for exhibits in one of the parlors of the Murray Hill Hotel may obtain reservation of room by writing to Fred. A. Smith, 220 Broadway, New York, who is chairman of the Committee on Hotels and Exhibits. Exhibits should be shipped, charges prepaid, consigned to the exhibitor, care of Murray Hill Hotel. If shipped as freight, bills of lading should be sent to Mr. Smith.

MT. PROSPECT WATER LABORATORY.

At the fourth annual meeting of the Brooklyn Engineers' Club in December last, Mr. George C. Whipple presented an interesting paper on the work of Mt. Prospect laboratory, Brooklyn, of which he is the director. Space will allow but a brief condensation of the main features of the paper.

In 1897 an appropriation was made for the establishing of a laboratory by the Department of Water Supply of Brooklyn, and the gate house of Mt. Prospect reservoir, near the entrance of Prospect Park, was selected as the site. Its isolation and elevation makes an admirable situation, fairly free from noise and dust. The upper portion of the building contains three rooms, the general laboratory

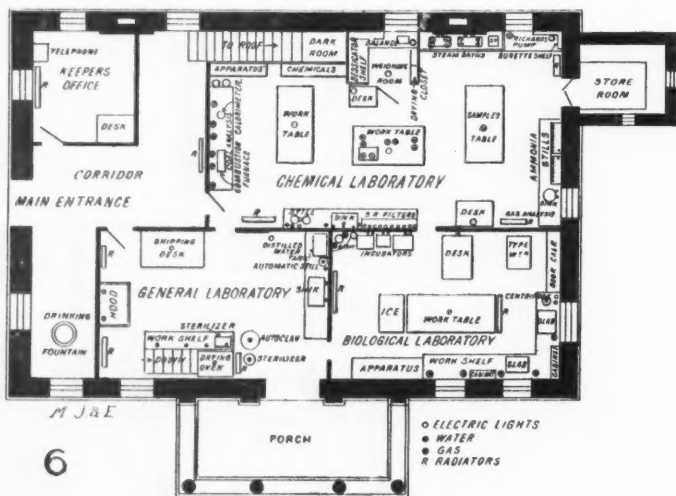


MT. PROSPECT LABORATORY, BROOKLYN WATER WORKS.

or preparation room, the biological laboratory and the chemical laboratory. The physical laboratory is in the basement and there is a sub-basement for bacteriological work during hot weather.

In the general laboratory, glassware and apparatus are washed and sterilized, culture media prepared, and all chemical operations liable to vitiate the air, are performed. The room contains all necessary hoods, sinks and sterilizers and a distilled water tank from which water is delivered to the other rooms. The biological laboratory is devoted to the bacteriological and microscopical examinations of water and to the study of the organisms found. There are, in this room, three incubators, an ice chest for the storage of culture media and place for sterilized apparatus.

The largest room is devoted to the chemical laboratory and contains a weighing room, drying closet, steam baths, a battery of twelve stills for ammonia distillation, Sedgwick-Rafter filters, apparatus for gas analysis and various pieces of specially designed apparatus for analysis. The floors, work tables and shelves are marble-tiled throughout.



FLOOR PLAN OF LABORATORY—MT. PROSPECT, BROOKLYN.

The physical laboratory is not yet completed, but at present contains a crusher, coal sampler, sieves for sand analysis and a complete outfit for cement testing.

The laboratory work consists of water analyses, miscellaneous analyses and experimental work.

The routine work of the water analyses is the regular examination of water sent from all parts of the water system. The character of the Brooklyn system requires thorough and minute examination and such is given it at Mt. Prospect. The regular work consists of daily examination of three samples of water from the Ridgewood pumping stations and a city tap; complete physical, chemical and biological tests of nine samples collected weekly from the system; physical, biological and partial chemical examination of twenty-four samples from the supply ponds obtained each week, with complete analyses monthly; complete tests of nineteen samples taken monthly from the driven wells; and complete investigation of twenty-one samples obtained quarterly from the private water supply companies of Brooklyn and the Borough of Queens.

The water samples are collected from the water shed in the forenoon and shipped to the laboratory, the average time elapsing between collection and analysis being three hours. The water is sent in gallon bottles for chemical and smaller sterilized ones for bacteriological tests. The larger bottles are not sterilized but carefully cleaned with chromic acid.

The stoppers of the smaller bottles are covered with tinfoil, and each is placed in a separate tin box with a screw cap. The tin boxes are packed in portable ice boxes made in two sections. The outer is packed with asbestos and lined with copper, the inner being a copper tray to hold the tin boxes and separated from the outer box by a space large enough for sufficient ice to last eight hours in hot weather.

Because of the shallowness of the supply ponds, it is unnecessary to collect samples at a lower depth than one foot. At the distribution reservoirs the samples are taken just outside the gate houses, where a representative mixture of the water is obtained. The temperature, at time of collection, date, name of collector, etc., of each sample is forwarded to the laboratory.

The physical examination of each sample consists of the usual observation of its temperature, general appearance, turbidity, color and odor.

In the chemical analysis the presence of nitrogen is determined in forms of albuminoid ammonia, free ammonia, nitrites and nitrates; the total residue on evaporation, loss on ignition, the presence of chlorine, iron and hardness are found in the usual way. To supplement these tests the oxygen consumed, alkalinity, incrusting constituents, dissolved oxygen, carbonic acid, etc., are sometimes determined.

The examination of the samples under the microscope determines the amount and character of the organisms present. In these tests the Sedgwick-Rafter method is employed with certain modifications.

Bacteriological tests are made to determine the number of bacteria in the samples and especially for the presence of *bacillus coli communis*. The work is mainly quantitative, no general qualitative work being undertaken.

The growth of the odor-producing organisms in Brooklyn's reservoirs has, of late years, caused much trouble. The presence of *asterionella* is very prominent at various periods, but is not the only odor-producing structure. *Anabaena*, *synedra*, *cyclotella* and other forms are sometimes abundant. In Mt. Prospect reservoir, *synedra* appears regularly in the spring and fall and it is worth noting that its appearance is after that of *asterionella* in the spring, but before that diatom in the fall.

Next to *asterionella*, *anabaena* has caused the most trouble in Brooklyn's water. In the summer of 1898 the growth was very large and in the fall it was necessary to empty and clean basin No. 2 to prevent a recurrence of such growths in the future.

As a rule Brooklyn water has very few protozoa, but *mallomonas* and *cryptomonas* have reached a considerable number.

To the Brooklynites, however, the number of organisms present in the tap water was more important than their presence in the reservoirs. Before the by-pass was built at Ridgewood, all organisms in

the reservoirs had free access to the taps of the consumers. The use of the by-pass, however, permitted the distribution of water to be so regulated that few organisms reached the consumer. Whenever the tests show the development of any odor-producing organism, the basin so affected is isolated and the water distributed directly from the force mains to the distribution pipes. The efficiency of the by-pass was well illustrated in November and December, 1899. In November, 1896, and February, 1897, the city water from basin 3 and Mt. Prospect reservoir had an exceedingly offensive taste and smell due to *asterionella*, but in the fall and winter of 1899 there was no odor in the water, although the above organism was much more plentiful in Ridgewood and Mt. Prospect reservoir than it had been during the year previous. The freedom from *asterionella* was due to the by-pass, since the portions of the city ordinarily supplied by Ridgewood basins 1 and 2 and Mt. Prospect reservoir, were supplied with water directly from the force mains.

STREET RAILWAY STORAGE BATTERIES.

At the time of the introduction of electric street railways in Germany several municipalities objected to the use of overhead wires in the central part of the city, and compelled the companies to adopt the so-called "mixed system"—that is, overhead wires in the outer districts and storage batteries in the center. This was especially insisted upon in Berlin and Hanover, and for a time seemed to work well, but the very large amount of snow in Berlin in the winter of 1899-1900 produced so many disturbances in the storage battery runs that the company was allowed to extend its overhead wire system through nearly the whole of the inner city, with the exception of the streets immediately adjoining the Royal Palace.

With true German thoroughness this change was only permitted after a careful scientific study of the question, and the results of this expert inquiry have only recently been made public, and contain much that is of interest.

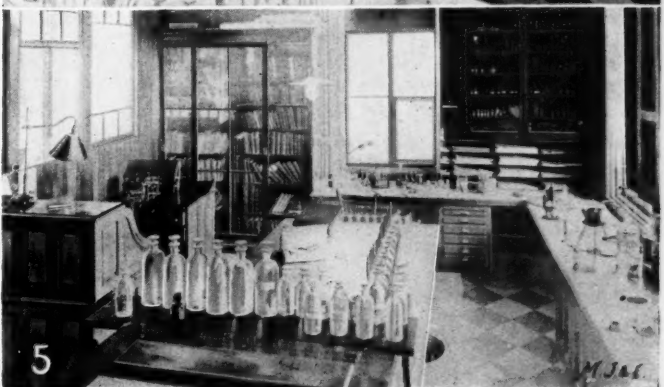
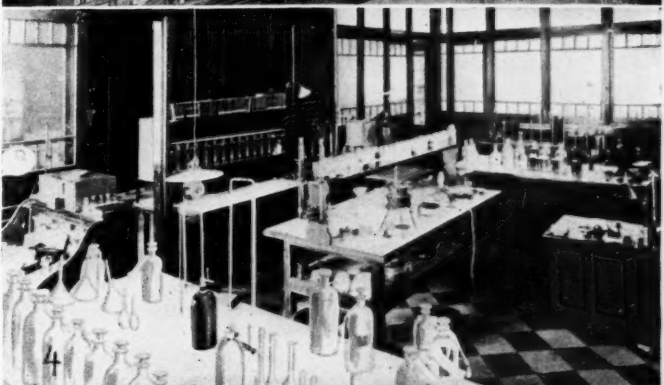
Two things are necessary for the successful operation of this system: First, the batteries must contain enough electricity to certainly carry the cars over the stretch of track without wires, and, second, they must be fully charged after every discharge.

The constant factors influencing the consumption of current are the weight of the cars, the curves and grades in the road and the number of stops and starts. This last point is of importance, and much depends on the motorman, as an experienced, cool man can save a great deal of energy as compared with one who is continually setting the brakes and then starting up quickly—a condition especially true in the inner part of a large city. The influence of the weather is very great and under the most unfavorable circumstances, that is, with frozen snow on the rails, three times the normal amount of current may be needed.

This condition of the rails is of great influence in charging the battery, and acts in three ways, and so affects the second requirement.

The higher the tension the quicker the battery can be charged, but with a poor condition of the track more current is used, and the voltage drops in the wires, thus taking a long time to complete the charge; the resistance between the wheels and the rail is high, and the amount of current taken from the battery on the storage battery stretches is also high.

The cars employed in Berlin have eight wheels and two motors each of twenty-one horse-power, and weigh with forty passengers about twenty tons. Tests of the batteries show that when new they have a capacity of twenty-five ampere hours, which diminishes 0.72 ampere hours for every 1,000 car miles run. To load these batteries to their full capacity requires from thirty to forty minutes, if charged while in motion, provided the current remains constant at 500 volts; but if, as is the case with poor track conditions, this voltage falls below this it may require over an hour for charging. A series of tests made of the consumption of electricity from the batteries when running under favorable conditions gave 4.64 ampere hours per mile in Berlin, and a similar test on the Charlottenburg railway gave 7.95 ampere hours per mile. It was impossible to repeat the tests in Berlin with heavy snow, as the system broke down entirely, but at Charlottenburg under these conditions the



SECTIONAL VIEWS OF MT. PROSPECT LABORATORY.

consumption of electricity rose to 26.2 ampere hours per mile; so that even with new batteries the car could only be guaranteed to run one mile before recharging.

If longer distances are to be run, the tracks must be kept clean and free from snow, which, in a city like Berlin, with a very dense traffic, is impossible, or the batteries must be increased in size, which, considering the present weight of the cars, is impracticable, or smaller cars must be used, which cannot, of course, be done if travel is very great. On the strength of this investigation, the mixed system was given up in Berlin, and the conclusions drawn from the report would seem to be applicable to every large city where traffic is dense and the snowfall considerable.

In Hanover, on the other hand, a much smaller city than Berlin, the mixed system has worked generally well, although there have been a number of disturbances due to snow on the storage battery portion of the road. There, however, the density of traffic in the streets is very much less than in Berlin, and it is therefore easier to keep the tracks clean, and for the same reason it becomes unnecessary to apply the breaks so often. Tests show that in Hanover, on an average, a car can run three times as far on the same amount of current as in Berlin.

At the Tramway Congress, held in Paris, in connection with the Exposition, considerable time was given to the discussion of this mixed type of operation, and with the single exception of the manager of the railway at Hanover all street railway managers who were present condemned it, and it was the universal opinion that no progress had been made in this line in the last five years.

The great weight of the cars involving special construction of the road-bed, the high cost of the batteries, their rapid depreciation and the high cost of repairs were all given as reasons against the use of storage batteries for traction purposes.

MUNICIPAL OWNERSHIP OF PUBLIC LIBRARIES.

By JENNIE ELROD, LIBRARIAN, COLUMBUS, IND.

The public library is the only educational institution from which the students never graduate. Its courses of study are so many and so different in character that, like the river, it "goes on for ever." It affords mental food for the student as well as the veteran novel reader, for the searcher after truth as well as the searcher after fiction. To meet these wants and desires there have sprung up all over the country free public libraries. By "free public libraries" is meant libraries under municipal control. Though there may be some endowed libraries which are free to their communities, in almost every instance access to them is only gained through the payment of an annual stipend called membership fees. Though this amount may be no more than the tax levy for the maintenance of the free institution, yet there is not the same feeling of proprietorship. "Government of the people, by the people, and for the people" is vastly superior to a government for the people, and bespeaks a living interest, whereas the other would be only passive. The citizen is encouraged in the public library to make known his desires that they may be filled, whereas in the endowed institution this is seldom done. The very fact that the one depends upon the support and good will of the public renders it anxious to assist, while the other in its independence may act as it chooses. Not only is this spirit of dependence and independence manifest in the willingness with which requests are filled, but also in the effort on the one side to reach all phases of society, while the other panders almost entirely to the more cultured element.

For instance, in our own library we endeavor at all times to discover the particular subject in which the individual is interested that we may provide him with material and afford him the opportunity of fully investigating the theme. Particularly do we do this with children, they being easier to reach and more amenable to suggestions. Further than this, we are now asking machinists and factory people to

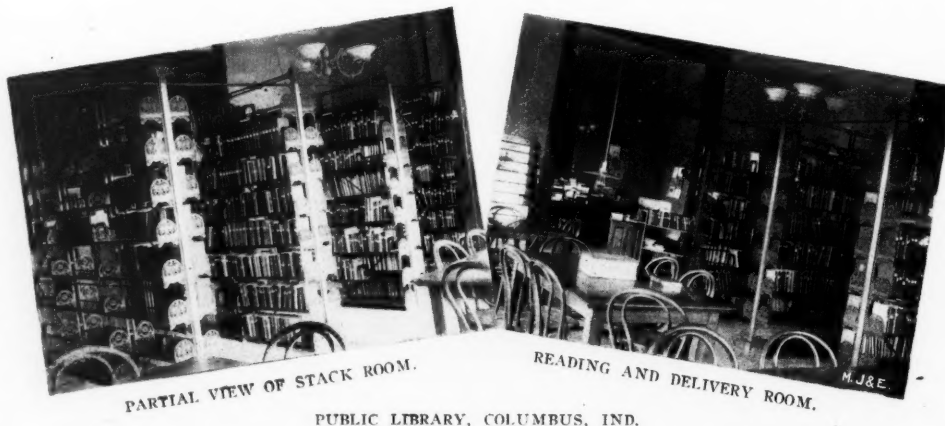
submit lists of books which will be as assistance to them in their vocations.

It is believed by all educators that the best results can only be obtained by the active intelligent co-operation of the librarian and teacher, and here again do we see the advantages of municipal control. In this State, where both are under the direct control of the Board of School Trustees (they being elected by the City Council), it is believed that very effectual work may be done. I say "may be done" advisedly, since it has only been within the past few years that the laws of this State made it possible for the smaller cities to provide themselves with libraries, and occupied, as are the first years of any library, with problems of organization and government, we may expect far greater results in the future than have been accomplished in the past. If the child is convinced that the book he studies in school is merely the introduction to a subject and the habit of research and reading is thus early formed we may indeed expect great things of the future generation. We have added some 400 volumes to be used as supplementary reading in the schools. These books may be retained by the teachers for a longer period than the other books and are selected with especial thought as to the needs of the child.

Our library in Columbus is fairly representative of what may be done under municipal ownership, and therefore I will cite a few points of its history in illustration. It is supported by a tax of 3 cents on the \$100, which gives us an income of about \$1,300 a year. It was first opened to the public on August 9, 1899, and during the first year had a circulation of 26,958. The library contained 2,266 volumes when opened, to which have been added 2,068, making a total of 4,334. The Dewey Decimal Classification System is used, and by this arrangement the books on any one subject are placed together on the shelves. It was early decided that as access to shelves was constantly growing in favor among libraries we would be in the van in this movement. Therefore, the shelves have been, from the first, entirely free to the public. While there may be some objection to this method from the library point of view, yet it is surely the best plan for the public well-being. Not only does the individual in this way get a complete idea of what the library contains upon the question which he is considering, but the process of selection is beneficial. Especially is this true with children, their powers of discrimination being greatly accelerated. Of course this power of discernment does not, with the child, become a fine art, and I presume many books are chosen because they are "little" or "new," but yet it plays a part in his education.

Our cataloguing is a card system, such as is used in almost all libraries at present. Under this method a separate card is made for the author, title and subject of each book. Where the book has many subjects each of them has a card, even if there be fifty or more. These cards are arranged alphabetically in a case which contains at present about 11,000 entries. This card catalogue is open to the public and is supplemented by lists of new books which appear from time to time in the newspapers.

For loaning books we use what is known as the Brown charging system. The aim in charging schemes is to find a method that will answer the most questions, such as: Who has a book? When was it taken out? When will it be due? etc. This the Brown system



PUBLIC LIBRARY, COLUMBUS, IND.

does, and that with very little trouble. Two cards are given to each applicant, in order that he may take two books at the same time—a book of fiction and a book of non-fiction. This plan was adopted to encourage the reading of better books, and in order that the question of selection might not lie between the two classes. Where the reader may take both the fiction will not be so entirely favored. The last census places our population at 8,130, and of these 1,748 are library applicants.

It is clear that the municipally controlled library has the larger public, and that being admitted the question of its superiority over the endowed institution is settled forever. Not but that in large cities the latter have a place, it being possible for them to make specialties of higher subjects and to collect rare and expensive editions which the public library endeavoring always to furnish "the best reading for the largest number at the least cost" could not afford to purchase; but considered as a force for the betterment and uplifting of mankind the free public library stands above and alone in this great field of labor.

STREET CLEANING IN WESTMINSTER.

BY GEORGE LIVINGSTONE, C. E.*

THE street cleaning systems of the various districts of the city of Westminster, England, are not uniform. In the district of St. George, Hanover square, the principal thoroughfares are, under present arrangements, swept daily by gangs of sweepers, who commence work in the early morning, assisted by horse sweeping-machines, in addition to which men are employed the whole day long (the number varying according to the importance of the thoroughfare) in sweeping up the deposit from the surface into convenient heaps at the sides of the roadway. These heaps are collected, and either deposited in the "orderly bins" provided for their reception or at once removed in carts to the depot.

During the summer months the principal thoroughfares are washed, some of them daily, and others two or three times a week as may be thought necessary; the process of washing, however, is performed by water-carts spreading sufficient water on the roadways to liquefy the mud, so that it may be more easily swept from the surface. Every precaution is taken to prevent the mud entering the gullies or sewers, and the whole of the accumulation thus swept is removed in carts (an average distance of one and a half miles) to the depot, where it is barged away by contract, at prices varying from 1s. 6d. to 2s. a cubic yard. This is naturally a very slow and expensive process. In Piccadilly and part of St. James street the process of washing is greatly facilitated by the use of hydrants, etc. The cleansing in the districts of St. Margaret and St. John, except that there are no hydrants, is otherwise carried out generally in a similar manner.

The district of the late Strand Board of Works is perhaps the only one in which the streets are cleansed by a thoroughly organized system of flushing by hydrants and hose pipe. A similar method, but less extensive in character, is in operation through the districts both of St. James and St. Martin, and, to the limited extent mentioned, in St. George, Hanover square, men and boys, however, being in addition employed throughout the day sweeping and clearing up the deposit from the street.

I have always advocated, as a general principle, a thorough system of washing or flushing the streets with water as being, perhaps, the most efficient method of street cleansing. Such a system, however, must be governed in its application by judgment and discretion, the condition of weather, etc., and can only be adopted where the streets are paved with an impervious material, such as wood, stone, asphalt or other equally suitable form of pavement, but its efficiency depends upon the manner in which it is carried out, the means of disposing of the refuse, the distance to which (if removed in carts) it has to be taken, and the facilities for obtaining a plentiful supply of water, matters which, under present conditions, require very careful consideration.

* City Engineer of the city of Westminster, England.

The restrictions hitherto imposed by the London County Council (in regard at least to two of the larger districts of the city), making it an offence under penalty to discharge, or permit to be discharged, any liquid filth into any of the street gullies or sewers, has been one reason, no doubt, why the cleansing by water has not been more universally extended. This restriction, I understand, has now been, or is likely to be, conditionally withdrawn, and provided the streets are first swept of the denser filth, and "catch-pits" are constructed, the street washings will be allowed to be swept into the sewers.

If the London County Council sanctions this arrangement it will greatly facilitate the better cleansing of the streets. But I am inclined to think that, for obvious reasons, they will probably hesitate to do so. It is doubtful whether the sewers are either in size or construction capable of receiving and discharging such an enormous quantity of additional filth as the liquid sweepings of so vast an area as the streets of London under such a system would yield. In any case the difficulty and cost of dealing with it, either in the sewers or at the "outfall," would be considerably increased. But there are other difficulties—viz., the possibility of obtaining a plentiful supply of water and the cost of its supply. Even if the water companies can supply the water, which is doubtful, the cost must be considerable.

The annual cost of cleansing the streets by water in the district of St. Martin and the Strand is approximately £500 per mile. Taking this as a basis of calculation, the cost of extending the system to all the main thoroughfares of the city—about eight and one-half miles—would be approximately about £4,250, exclusive of the initial outlay necessary for constructing catch-pits, providing and fixing hydrants, supplying hose pipes, trucks, etc., which would amount to about £3,500. In this estimate I have made no allowance for any saving in the cartage and barging away of such of the sweepings as would be discharged into the sewers, because it is obvious that whatever saving might be thus effected, the greater portion, if not all of it, would, in all probability, be expended on extra labor in cleaning out the catch-pits, sewers, etc. Hitherto no charge has been made for water used for cleansing, either in the district of St. George, Hanover square, or in St. Margaret.

There are nearly 100 miles of streets in the city, paved with different kinds of pavement, the cleansing of which, under existing arrangements, costs approximately £50,000 per annum. To cleanse them all in the manner suggested would involve an additional expense—apart from the initial outlay—of from £20,000 to £25,000 per annum. Having regard to all the circumstances, I am of opinion that the cleansing by water may well be limited to the "main" thoroughfares of the city, at least for the present, and the cleansing of the other streets continued on the system now in operation. In the event of the council extending this system of cleansing, I think the work would be best carried out between the hours of midnight and 7 o'clock in the morning.

I desire here, however, to emphasize the great importance of thorough capable outdoor supervision, without which no system, however well devised, can succeed. In this connection I may mention that in another report submitted to the Works Committee, March 12, 1901, I have suggested, in outline, a scheme for cleansing the whole city, which, if adopted, would, in conjunction with the additional process now recommended, do much to render the cleansing of the streets, under the exceptional conditions already mentioned, as nearly perfect as can be reasonably expected.

I submit for your consideration the following recommendations:

(1) That, subject to the consent of the London County Council, all the "main" thoroughfares in the city be thoroughly cleansed with water by the use of hydrants and hose pipe, and the contents washed into the sewers, the surface of the street being first swept with machine brooms or other form of sweeping, and subsequently well cleansed with "squeegees."

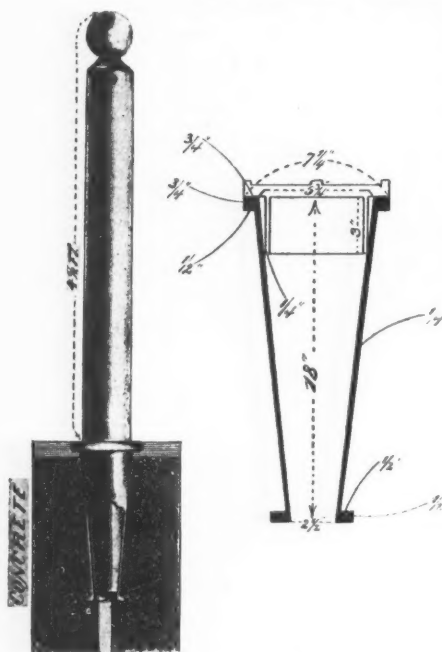
(2) That the work of cleansing these thoroughfares be carried out between the hours of midnight and 7 o'clock in the morning daily, Sundays included, and at such other times as may be thought necessary, the conduct of the work being regulated by the condition of the weather, etc..

(3) That, in addition to the work of washing, a sufficient number of men or boys, or both, be employed during the day to clean

crossings and footways, sweep up and collect the deposits and all other refuse from the streets, and remove the same to the "orderly bins" provided for their reception, a certain area being allotted to each man or boy, responsible to the road foreman.

(4) That the macadamized roads and other streets in the city be cleansed by the system at present in operation, with such additional labor and plant as may be found necessary—*The Surveyor, London.*

TO KEEP CROWDS BACK.



SAN FRANCISCO has solved the problem of keeping the streets clear of crowds for parades without the usual cordon of police and also without disturbing pavements by the insertion of poles upon which to string wires. The appliance has been accepted by the Committee on Public Affairs, and both sides of Market street from the ferries to Van Ness avenue have been equipped with it, the work having been completed in time for the recent celebration in honor of President McKinley.

Metal sockets are sunk in the street pavement just outside the curbs and fifty feet apart. These sockets are conical in shape, having an inside diameter of five and three-fourths inches at the top, tapering to two and one-half inches at the bottom, and will be eighteen inches in length. There are two objects attained in having them conical. First, that the greatest thickness of the post to be inserted will be at the point where the strain is greatest, and the amount of metal necessary is greatly reduced, thus lessening the cost. Second, being conical, the post will not bind too tightly and when shrinkage occurs, they will drop lower and always be firm.

These sockets will be imbedded in and surrounded by four inches of concrete, thus giving thorough rigidity to the socket. The sockets are open at the bottom and a hole one inch in diameter runs through the concrete at the bottom, thus permitting water entering the socket to drain through into the sand beneath. A cast iron removable cap, lettered "S. F. P. D." (San Francisco Police Department), fits into the top of the sockets when not in use, and the whole is flush with the surface of the pavement. To prevent the caps being carried away, a wrought iron staple is cast into the centre of the inside of the cap and a chain, attached to this staple runs through a notched opening in the flange of the cap and the upper edge of the socket and is imbedded at the other end in the concrete outside the socket.

Into these sockets, when parades are held, will be inserted wooden posts of Oregon pine, six feet in length, four and a half feet being above ground, turned round and with a knob turned at the upper end around which the wire cable can be fastened. As the Police Department has in its possession sufficient wire cable this item need not be considered.

To properly equip Market street, from the ferries to Van Ness avenue, required about four hundred sockets.

THE St. Paul Gas Light Company will have to remove their posts in accordance with proceedings brought by the city of St. Paul in view of the introduction of electric lighting. The Gas Company claimed breach of contract and carried their case to the Supreme Court. The court dismissed the gas company's appeal for want of jurisdiction, though Justice White intimated that the city ordinance did not necessarily effect a breach of contract.

Department of Public Safety

FIRE POLICE HEALTH

NEW FIRE CHIEF FOR WASHINGTON.



ROBERT WILLIAM DUTTON.

ROBERT WILLIAM DUTTON has been appointed chief of the Washington Fire Department to succeed James Parris, a veteran fire fighter, who held the position of chief for some fifteen years and retires because of ill-health.

The appointment of Mr. Dutton marks a new era in the administration of matters pertaining to the fire department of Washington. His predecessor was a practical fireman in every sense the term implies, having commenced his career as a volunteer in the days of the hand fire engine, long before the "steamers" were dreamed of. When the Metropolitan Fire Department of the

Capital City was organized ex-Chief Parris secured an humble position with it and continued in its service with but brief interruption until the day of his retirement as its chief.

The new chief is a trained newspaper man, but knows, so those disposed to criticise say, little or nothing of the practical side of combating a conflagration. The appointment of Mr. Dutton, despite the fact that he has had no practical experience in fighting the "fire fiend," meets with general approval among the conservative element interested in such matters at the National Capital.

The radical move of the District Commissioners in selecting Mr. Dutton, admittedly inexperienced in the practical details of combating a conflagration, is a result of a determination on their part to make the office an executive one. This determination is due to the growth of the fire department, which is one of the most important and extensive branches of the government of the District of Columbia. The department has grown to such prominence that its interests are to be best conserved by placing a man at its head who has marked ability in executive work.

Chief Dutton assumed the control of his new office May 1st, surrounded, figuratively speaking, by a shower of bouquets and other evidences of the good wishes of his friends, as well as the adherents of the other candidates who had been put forward for the position.

He was at the time of his appointment a member of the staff of the *Evening Star*, having had a connection with that newspaper extending over a period of ten years. During the past few years he has been assigned to the Municipal Building, and through this assignment has been thrown into close contact with the authorities who govern the affairs of the Capital City of the Nation.

Chief Dutton has for some time been a close observer of municipal affairs generally, but taking a particular interest in the workings of the fire department system in this and other cities. His knowledge of fire department affairs and his views on matters connected with that branch of the government of the District of Columbia impressed itself upon the Commissioners, with the result that when Chief James Parris announced his intention to retire, the question of changing the head of the fire department into an executive office and placing Mr. Dutton in charge at once presented itself to Mr. H. B. F. Macfarland, president of the Board of District Commissioners, who has entire supervision of the department.

Mr. Dutton is a native of the District of Columbia, having been born there forty-three years ago. He has lived in Washington all his life and was educated in the public schools. He afterward took a three years' course in law at the Columbian University. He did not engage in the practice of the profession of law, however, but chose to follow for seven years a trade he had previously learned—that of compositor and printer.

Mr. Dutton was employed for several years in the Bureau of Navigation of the Navy Department, under Admiral Walker, as a clerk, leaving this position to enter the field of journalism. For the past ten years he has been a member of the staff of the Washington *Evening Star*, being for a long time in charge of the reporting of court proceedings for that newspaper. From the City Hall he was transferred to the Municipal or District Buildings, where he has remained up to the time of his appointment to be chief of the Washington Fire Department.

A SOUTHERN SCHOOL FOR FIREMEN.

THE historic city of Charleston, S. C., is the first one in the South to establish a training school for firemen. Chief Marjenhoff, on a visit to New York city some two years ago, was much impressed with the work of the New York training school, and determined to establish a similar school in his own department. The authorities ordered that his recommendation should be carried out, which resulted in the detailing of Assistant Chief Behrens to spend thirty days in the training school of the New York department, where he received the full course of instruction under the veteran head of the school, Captain McAdams.

Assistant Chief Behrens entered the school as a probationer, the same as any recruit of the New York department, and was assigned to duty in one of the most active truck companies in the city. This company responded to 103 calls during the month of probation, which, in addition to twenty-one half days spent in the training school, kept Mr. Behrens busy enough for all practical purposes.



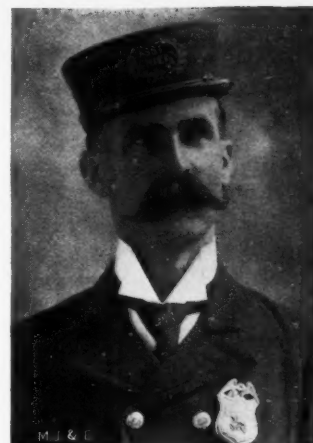
TRAINING SCHOOL AT WORK—CHARLESTON FIRE DEPARTMENT.

When he graduated it was with honors and a most thorough understanding of the methods and practice of such a school.

Immediately upon his return a seventy-foot scaling tower was constructed, and the school provided with all the necessary apparatus, and the department was divided into classes of ten and immediately put in training. The morning hours, from 9:30 to noon, are set aside for the drill, twice every week. Sixteen drills constitute a complete course and since the inauguration of the school two classes have been graduated, the members of the second having just received their diplomas.

Among other things the men are taught to climb the front of the seventy-foot tower by means of the scaling ladder and to carry a "sandman," weighing 125 pounds, down a chain of these ladders. Many other feats of life saving are performed under various conditions, and with the aid of one or more men. Besides this there is constant drill in the use of every piece of apparatus in the department and a regular course of instruction in tying knots of all kinds.

The Charleston department is organized on a basis of part paid men and part "call men," which interferes with the rapid graduation of the paid men, as a smaller number of men only can be spared at one time for drill; but all the members of the force, both the regulars and the "call men" are making encouraging progress, and it will be only a matter of a little longer time when the entire department will consist of graduates in the art of life saving at a fire. The rule that all new members of the force should take this training during their probationary period was established shortly after the new school came into existence, and Chief Marjenhoff says that the rule will be most rigidly enforced.



LOUIS BEHRENS, Asst. Chief, Fire Department, Charleston, S. C.

SAVED BY THE LIFE NET.

How to save human life at a fire has long been one of the perplexing problems of the scientific fire fighter. There are times when the only way of escape is by jumping from a window or from the top of a building. To jump from any considerable height to the ground is almost certain death or serious injury, the unfortunate ones being often maimed for life. To provide a means or device which could be relied upon to save human life in such an emergency has puzzled many a head for many a year, and not until within recent years has the successful life net been constructed. Many experiments have been tried and much money expended in the solution of this problem, and to Mr. T. F. Browder, of Greenfield, Ohio, belongs the honor of constructing the first successful life-net.

This net is circular in form and about thirty feet in diameter. It has a rim of steel to which the net is attached by springs to take up the force of impact of a falling body. That it is remarkably efficient as a life-saving device was satisfactorily demonstrated at the apartment house fire in New York City on the night of May 7, when more than a score of lives were saved with its aid.

The net was only recently introduced into the department at the suggestion of Chief Croker, and the night in question was the first time that it had been in actual service at a fire. The firemen of the department had demonstrated its usefulness in practice at the training school, but this was the first crucial test. It was brought into position on one side of the burning building and firmly held by half a dozen policemen and half a dozen firemen, when fifteen persons jumped from the third story without injury. Afterward others followed suit, jumping from the fourth, fifth and sixth stories, and all landed safely and without injury. Some others, who in their wild frenzy, jumped to the ground before the net was placed in position, were seriously injured or maimed for life.

This remarkable demonstration of the efficiency of the life net should be a sufficient recommendation to every fire department in the

United States to add it to its service. The progressive chiefs will not be slow to recommend its purchase, for they will be the first to appreciate its merits.

FIRE DEPARTMENT ITEMS

—Chief Engineer Miles Humphrey, of Pittsburg, complains of the lax regulations concerning the storage of explosives and the use of acetylene gas machines. The matter will no doubt come up in the State Legislature for adjustment.

—Chief McAfee, of Baltimore, severs his connection with that department June 5, to accept a position with the Washington Electrical and Manufacturing Company, of Pittsburg. Chief McAfee has been with his department fifteen years, working his way to his present position from the bottom. His record is that of an exceptionally able fire fighter.

—All delegates to the convention of the Municipal Electricians to be held at Niagara Falls, September 2, 3 and 4, going via New York City, would do well to communicate with F. C. Mason, of Brooklyn, who has arranged for reduced railroad fare. For full information, address F. C. Mason, Supt. Police Telg., 16 Smith street, Brooklyn, giving the number in your party.

—The following is told of Santa Barbara's fire chief: During President McKinley's recent swing through southern California he was welcomed to Santa Barbara with as great acclaim and strewing of flowers as elsewhere. The fire chief was out with the rest to welcome the President. As he waited he was told that his house was afire. "Let it burn," he replied. "I will wait and see the President. I can build another house, but I may never have another opportunity to see the President of the United States," and he remained while his house burned down.



RECENT BOOKS.

A Landmark History of New York. By Albert Ulman. Cloth, \$1.50. D. Appleton & Co., New York.

Of late numerous municipalities are taking up the idea of marking with suitable memorials the historic spots within their borders. To those interested in such projects the above volume will undoubtedly prove helpful, as fac-similes of the memorial tablets erected by the historic and patriotic societies of New York are shown. The volume is particularly valuable as a handbook, and working outline of the history of the metropolis from its earliest day. Intending visitors to the metropolis other than on business bent could do no better than read this book.

Addresses and Proceedings of the National Educational Association, Charleston, S. C., 1900. Published by the association and from the University of Chicago Press. Irwin Shepard, Winona, Minn., is secretary of the association.

The nature of the contents is fairly well indicated by the title. The addresses are papers prepared by authoritative educators, who participated in a programme designed to cover the whole educational field. The compilation of these addresses brings together in a useful way ideas and ideals that should be familiar to those having to do with the administration of school work. The topic of city schools is adequately discussed. Those interested in school house architecture may find in the volume helpful suggestions.

Seventh Annual Convention: American Society of Municipal Improvement.

The proceedings of this body which met in Milwaukee, Wis., August 28, 29 and 31, 1900, comprise a paper bound volume of over 400 pages. Sewage disposal, water purification, street paving, and

city government in its political aspects were among the topics discussed. D. L. Fulton, Allegheny, Pa., is the present secretary. A copy of the proceedings can, no doubt, be had from him.

Concerning Children. By Charlotte Perkins Gilman. 12mo, cloth, decorative. 300 pages. \$1.25. Small, Maynard & Co., Boston.

The state, and its servant the municipality, is doing many things nowadays that it once did not do. One of its growing functions is to look after the children. In this fact is justification of a review of this volume here. The volume is not a fanciful creation, but rather a collection of helpful essays toward the better understanding and development of our embryonic citizens. The mayor and superintendent of schools, police commissioners and charities departments could use the book to advantage.

Up From Slavery: An Autobiography. By Booker T. Washington. Cloth, 314 pages. \$1.50 net. Doubleday, Page & Co., New York.

All cities have not to face the "Negro Problem," but all municipalities are organized to conserve intense human interests. A deep realization of the needs of the lowly cannot but enhance the value of any municipal official to the people he serves. The volume mentioned is one of inspirational power along those lines, and at the same time as thrilling as a romance and a deal more helpful than any of the flood of so-called popular novels.

Disposal of Towns' Refuse. By W. F. Goodrich, A. I. Mech. E. With seventy-five illustrations and numerous tables. 8vo, 334 pages. Cloth, \$3.50. John Wiley & Sons, New York.

We have reviewed a number of books this month which did not profess to treat directly of municipal problems, but this volume is intensely practical. It deals directly with one of the most pressing matters of municipal administration. Some of the chapter headings give a good hint as to its worth. They are: "Evolution of the Refuse Destruction," "Refuse Sorting and Utilization," "Value of Towns' Refuse for Steam Raising," "Progress in Refuse Destruction in the Country Boroughs." There are twenty-five chapters in all.

The Nineteenth Century, a Review of Progress. Reprinted under arrangement, from *The New York Evening Post* of Jan. 12, 1901. Cloth. 494 pages. \$2. G. P. Putnam's Sons, New York and London.

The institutions of the twentieth century will be evolved from those of the century just closed. A full and comprehensive measure of the work completed should precede the building for the future. The volume under consideration presents in a terse way the reasons for and the accomplishments of the nineteenth century. The chapters on "Law and Government," "History," "Sociology," "Education and Science" and "Transportation" should be of pertinent interest to those engaged in municipal administrative work.

The Improvement of Towns and Cities. By Charles Mulford Robinson. One Vol. G. P. Putnam's Sons, New York and London.

The author of this volume is a member of many societies for the improvement of municipal conditions and speaks *ex cathedra*. Among the subjects which he discusses are sites, street plans, bridge construction, street paving, cleaning and lighting; the disposal of necessary nuisances, such as wires, smoke and the noises of street traffic; the regulation of advertising, the beautifying of utilities, the growth of trees and possibilities of public gardens. All these topics are suggestive to any one acquainted with municipal affairs, and Mr. Robinson's ideas are good. Public parks and museums of art come in for their share of comment.

Hendrick's Architectural Engineering and Mechanical Directory of the United States, Edition of 1901. Cloth, \$5.00. Samuel E. Hendricks Co., 61 Beekman, 61, 63, 65 Gold and 91 Ann streets, New York.

This volume contains over 1,200 pages of matter absolutely invaluable to contractors or others who are about to engage in the construction of anything from a pavement to a railroad. For the railroad it contains the addresses of dealers in everything from a locomotive to a track spike, and for trolley roads everything from a dynamo to a fare

register. Dealers in supplies for the machine shop or factory, for the electrical trade and mechanical industries; in mills' and engineers' supplies, are fully listed. The index of contents contains forty-six pages and makes reference to the rest of the book easy and convenient.

The lists of architects, or carpenters, contractors and builders, of engineers and of plumbers and gasfitters, all classified according to the States in which they reside, are very comprehensive. The book is a valuable one.

Appleton's General Guide to the United States and Canada, revised for 1901. Two volumes. D. Appleton & Co., New York.

The first volume covers New England, the Middle States and Canada; the second volume the Southern and Western States. The books are just what they pretend to be—guides for travelers. They do for the tourist in America what Baedeker's guide books do for the tourist in Europe. They contain all kinds of information concerning depots, hotels, theatres, places of historical interest, etc. Both volumes are complete and edited up to date.

AMERICAN PERIODICALS.

The Steam Motor Truck As a Portable Power House. Eight page article by James Grieve Dudley. *Engineering Magazine* for May; price, 25 cents for single number; per year, \$3.00.

Saloons. A nine page descriptive article throwing light upon the control and lack of control of saloons by municipal authorities. By Robert Alston Stevenson. *Scribner's* for May. Single copy, 25 cents.

How Children Are Educated in Switzerland. By Prof. Andrea Baumgartner of Zürich Public Schools. An outline of the public school system in Swiss cities, especially as regards grading and compulsory attendance. Three pages. *The Chautauquan* for May. Price, \$2.00 per annum.

The Revolution in the Incidence of Taxation. A four-page article by Joseph Ackland, comparing the distribution of taxation among the various industrial classes and suggesting general principles for a more just distribution of the same. *Contemporary Review* for May. Price per copy, 40 cents; per annum, \$4.50.

Election Methods and Reforms in Philadelphia. Twenty-four page article by Clinton Rogers Woodruff. *Annals of the American Academy of Political and Social Science*, Philadelphia. \$1.00 per issue; \$6.00 per year.

Concerning a Minor Reform in Indiana. A paper of eight pages, advocating the bringing of relief of the poor in all localities into line with the most recent conceptions of the science of charity. By Alexander Johnson. May issue of the *American Journal of Sociology*. University of Chicago Press; price, 35 cents.

Municipal Ownership: What the Cities of Europe Do. By John Martin in the June *World's Work*. Price 25 cents. A description of methods employed in European cities for the management of gas plants, telephones, street railways, tenements and other properties which the municipalities have acquired.

Municipal Government in the United States. By John Ford. *North American Review* for May. Price 50 cents.

ENGLISH PERIODICALS.

A Retrospective Glance at Crimes and Criminal Law. An article of nine pages, which reviews the progress made by state and municipality during the past century in the detection, conviction and punishment of criminals. By J. A. Shearwood. *Gentleman's Magazine* for May, 111 St. Martin's Lane, London, W. C.

A National System of Education. A twelve page article discussing the possibility of centralizing the control of the public schools in England, especially as it affects the appointment and retention of teachers. By Claudesley Brereton. *Fortnightly Review* for May; price, single number, 40 cents; per year, \$4.50.

MUNICIPAL AND OTHER REPORTS.

Inaugural addresses of the following Mayors have been received: James F. Leonard, Lawrence, Mass.; Arwin E. Price, Elgin, Ill.; John F. Hurley, Salem, Mass.; M. R. Leonard, Waltham, Mass.

Alderman Henry J. Thein sends us the elaborate manual of the Common Council of Newark, N. J., compiled by Assistant City Clerk James M. Paterson. It is of convenient pocket size, bound in red leather and contains more than the usual amount of information.

General city reports have come in from the following places:

Springfield, Mass.; North Adams, Mass.; East Orange, N. J.; Appleton, Wis.; Quincy, Mass.; Youngstown, Ohio; Florence, Ala.; Rutland, Vt.; Memphis, Tenn.; Cleveland, Ohio; San Francisco, Cal.

Park conditions in the following cities are shown by reports from commissioners and superintendents: Harrisburg, Pa.; Cleveland, Ohio; San Francisco, Cal.; Park Commissioner Charles S. Anthony of Taunton, Mass., sends his report; Mankato, Minn.; Hartford, Conn.; Lincoln Park, Chicago, Ill.; Omaha, Neb.; Toledo, Ohio; Dayton, Ohio.

City Clerk John J. Somers, of Gloucester, Mass., sends to us the manual of his city for 1901. It is bound in dark maroon leather and the pages have gilt edges. Other than containing the usual information the little book is replete with conveniences such as blank pages, receptacles in the covers, etc.

City manuals have also been received from Somerville, Mass., Everett, Mass., and San Francisco, Cal.

Reports concerning the water department have been received from the following cities:

Waltham, Mass.; Salem, Mass.; Gloversville, N. Y.; Superintendent Charles E. Bolling of Richmond, Va., sends us his annual report; Fostoria, Ohio; J. Crowell Mundy, general superintendent of Newark, has forwarded his report; Superintendent John B. Heim, superintendent of water works, Madison, Wis., has handed us his report.

STATE ENGINEER AND SURVEYOR EDWARD A. BOND of the State of New York hands us his report for 1900 and also his monumental work in the way of the "Report on the Barge Canal."

The idea of canal building has in the past few years received an impetus everywhere, and in Mr. Bond's state especially, the subject of canals is one of very common daily interest. To meet this interest this report of 1,020 pages, accompanied with a portfolio of thirty-four maps and plates, comes at a very opportune time. While the report is intended to be thoroughly accurate and scientific in its treatment of the subject, yet the lay reader with an interest along canal lines need not be deterred by the thought of a dry and forbidding official report.

Reports with various subjects have been received from the following sources: The annual report of city engineer, superintendent of parks and health officer of Mankato, Minn., are bound under one cover; department of public works, Cleveland, Ohio; the annual report of the city of Gloversville, N. Y., contains the report of City Engineer C. Fiske, which he sends us; ordinances and rules governing street department of Buffalo, and a number of pamphlets from the health department of the same place have come to hand. The journals of the Select and Common Council of Lancaster, Pa., have been sent in. Both Mayor White and Chief of Police Campbell of Schenectady, N. Y., send the annual report of the police department. The revised ordinances of Somerville, Mass., and also a copy of the new charter have been received. City Clerk J. M. Schatzel of Fostoria, Ohio, submits his annual report. City Treasurer John B. Shaw of Jamestown, N. Y., sends in his report. We have at hand the report of superintendent of streets of Oakland, Cal. Robert D. Evans, City Engineer of Haverhill, Mass., has sent in his annual report. We here acknowledge the receipt of the report of the health officer of the District of Columbia, and also a recent address of Commissioner H. B. F. MacFarland concerning the development of the District of Columbia. W. H. Marvin, secretary and treasurer of the Michigan Village Association, sends us Michigan's Bureau of Labor Statistics report. The electrical bureau of the National Board of Fire Underwriters sends in Quarterly Fire Report, No. 31.

MUNICIPAL BOND SALES FOR MAY.

THE flurry in Wall Street affected the sale of municipal bonds in May to a slight degree, but the temporary stagnation is passed, and the resulting easy money conditions which prevailed toward the last of the month has improved the demand for municipal bonds. If there had been no tempest in Wall Street the probabilities are that the sale of municipals would have exceeded the record of any year in the last five for the corresponding month, but as it stands to-day the sales for the month will total about \$14,000,000, which is \$2,000,000 in advance of the same month last year. The average sales per month, for the first five months, amount to about \$12,000,000, which is \$2,500,000 short of the monthly average for 1900. The most of this shortage is found in the total sales for January, which were more than \$8,000,000 less than the corresponding month the year previous.

The speculative movement has received a decided check, and there

seems a likelihood now that the sales for June will exceed those for May by about \$4,000,000, but it is hardly probable that the total sales for June will equal the \$25,000,000 for the same month last year. Present indications point to a much firmer market for general bonds and a greater freedom from the speculative spirit during the coming month, all of which cannot fail to benefit, to a slight degree at least, the sale of municipals. June will undoubtedly bring a fair market for municipal bonds, and there is no reason why the average city should not realize well on its sales. Being located in the best market in the United States the MUNICIPAL JOURNAL AND ENGINEER is in a first-class position to give accurate information and to lend assistance in other ways to prospective sellers of municipal bonds, and our readers should always bear in mind that we stand ready to give this assistance whenever called upon.

PURCHASER.	PURCHASE.	INT. RATE.	TERM, YEARS.	AMOUNT.	PRICE.
Bechtel, Geo. M., Davenport.	Waterloo, Ia., School Dist.	4 per cent. s. a.	5-10 Opt.	25,000	101.70
Citizens' State Bank, Local.	Sabetha, Kan., Electric Light Plant.	4 per cent. s. a.	10	10,000	100.25
City & District Savings Bank, Local.	Montreal, Que., Registered Stock.	4 per cent. s. a.	40	300,000	105.50
Cooley, Francis R., Local.	Hartford, Conn., South School Dist., Funding.	3½ per cent. s. a.	30	135,000	103.17
Cummings, C. S., & Co., Boston.	Gardner, Mass., Sewer.	3½ per cent. s. a.	1-25 Ser.	50,000	103.29
Darlington, H., Pittsburg.	Wellsville, O., Water Works.	4 per cent. s. a.	7 2-3 Avg.	75,000	104.158
Equitable Guarantee & Trust Co., Local.	Wilmington, Del., Sinking Fund.	4 per cent. s. a.	19¼ Avg.	50,000	107.50
Farmers' State Bank, West College Corner.	College Corner, O., Village.	5 per cent. a.		700	105.029
Henry, Judge, Berlin.	Ocean City, Md., Water Works and Sewers.	6 per cent. s. a.		5,000	Par.
Hudson Trust Co., Boston.	West New York, N. J., Fire House.	4 per cent. s. a.	1-8 Ser.	7,800	Par.
Jose, Parker & Co., Boston.	Stoneham, Mass., Water.	3½ per cent. s. a.	1-6 Ser.	30,000	101.003
Jose, Parker & Co., Boston.	Stoughton, Mass., Water.	4 per cent. s. a.	20½ Avg.	10,000	112.13
Kane & Co., Minneapolis.	Lowry, Minn., Town Hall and Jail.	5 per cent. a.	9 Avg.	3,400	101.17
Margley, A. H., Chicago.	Portland, Ore., Improvement.	6 per cent. s. a.	10	10,000	102.25
Merchants' Clerks' Savings Bank, Local.	Toledo, O., Various Street Improvements.	4 per cent. s. a.	31½ Avg.	152,883	102.172
Miles, J. H., Local.	Falls City, Neb., Refunding.	4 per cent. s. a.	12½-20 Opt.-Avg.	30,000	100.166
Murphy, Hugh J., Local.	Omaha, Neb., Paving and Sewer.	4 per cent. s. a.	20	148,000	108.108
Niagara Co. Savings Bank, Local.	Niagara Falls, N. Y., School District.	4 per cent. s. a.	20-24 Ser.	25,000	113.65
Norfolk Nat. Bank, Local.	Norfolk, Va., City.	4 per cent. s. a.	30	214,500	101.77
Police Pension Fund.	Akron, O., Street Paving and Improvement.	5 per cent. s. a.	1-4	4,000	102.05
Purnell, John R., Denver.	Ocean City, Md., Water Works and Sewer.	6 per cent. s. a.		5,000	Par.
Russell, Herman, Denver.	Mediapolis, Ga., Gas Light.	4 per cent. s. a.	5½-20 Opt.-Avg.	6,000	100.666
Second Nat. Bank, Local.	Lewiston, Minn., Pub. Improvement.	4 per cent. s. a.	6¼	5,000	100.20
Southold Savings Bank.	Greenport, N. Y., Electric Light Extension.	3½ per cent. a.	4-27 Ser.	12,000	104.80
Stoddard, Nye & Co., Minneapolis.	Minneota, Minn., Water Works.	5 per cent. a.	5-10 Str.	10,000	103.00
Taylor, Calvin B., Bangor.	Ocean City, Md., Water Works and Sewers.	6 per cent. s. a.		5,000	Par.
Tyler, Fogg & Co., Bangor.	Brewer, Me., Refunding.	4 per cent. s. a.	20	30,000	114.165
Unknown.	Opelika, Ala., Funding and School.	5 per cent.	30	40,000	Par.
Wagner, E. L., Chicago.	North Bend, Neb., Refunding.	4½ per cent. s. a.	10-20 Opt.	6,000	100.758
Warner, F. E., Philadelphia.	East Conemaugh, Pa., School.	4 per cent. s. a.	10-30 Opt.	35,000	102.967
Wilford, S. C., Local.	Akron, O., Cherry Street Improvement.	5 per cent. s. a.	3 1-3 Avg.	700	101.555
Wilford, S. C., Local.	Akron, O., Arch Street Improvement.	5 per cent. s. a.	1-5 Ser.	700	101.285
Wilford, S. C., Local.	Akron, O., Sewer.	5 per cent. s. a.	2 1-12 Avg.	1,300	101.307
Willey Savings Bank, Boston.	Brockton, Mass., Water.	3½ per cent. s. a.	30	13,000	105.76
Willey Savings Bank, Boston.	Brockton, Mass., Sewer.	3½ per cent. s. a.	5-20 Ser.	25,000	104.48
Willey Savings Bank, Boston.	Brockton, Mass., School.	3½ per cent. s. a.	1-13 Ser.	13,000	101.87
Willey Savings Bank, Boston.	Brockton, Mass., Stable.	3½ per cent. s. a.	1-12 Ser.	24,000	101.75
Willey Savings Bank, Boston.	Brockton, Mass., Street.	3½ per cent. s. a.	1-12 Ser.	24,000	101.75
Willey Savings Bank, Boston.	Brockton, Mass., Drainage.	3½ per cent. s. a.	1-10 Ser.	10,000	101.50
Dick Bros. & Co., Philadelphia.	Lakewood, N. J., School.	5 per cent. s. a.	9½	18,050	106.249
First Nat. Bank, Barnesville.	Milledgeville, O., Main Street Grading.	5 per cent. s. a.	1-10 Ser.	1,500	102.066
Highland Co. Bank.	Greenfield, O., School District.	4 per cent. s. a.	20	19,000	101.631
Klosterman, A. G., Local.	Oregon City, Ore., Refunding.	5 per cent. s. a.	20	30,000	100.666
Mechanics' Saving Bank, Local.	Cohoes, N. Y., Certificate of Indebtedness.	3½ per cent. s. a.	1-4 Ser.	14,930	100.161
Miller, J. P., & Co., Chicago.	Phoenix City, Ala., Water Works & Fire Pro.	5 per cent.	20-30 Opt.	25,000	Par.
National Bank, La Crosse.	Preston, Minn., School District.			7,000	101.071
Robinson, Roby, Atlanta.	Waynesville, N. C., Water.	5 per cent. s. a.	30	15,000	104.50
Savings Bank, Local.	Newport, R. I., School.	3½ per cent. s. a.	30	15,000	107.75
Silverthorne, N., Summerville.	Midland, Ont., Debentures.	4 per cent. s. a.	20½ Avg.	50,000	103.812
Sinking Fund Commissioners.	Jersey City, N. J., Funded Debt and Public Debt.	4 per cent. s. a.	30	389,000	109.00
Sinn, Matthew, Detroit.	Gladwin, Mich., Water Works.	5 per cent. s. a.	10	1,000	Par.
Southold Savings Bank.	Smithtown, N. Y., Refunding.	3½ per cent. s. a.	17½ Avg.	18,000	104.00
State Bank.	Traverse City, Mich., Water Works.	4 per cent. s. a.	20-30 Opt.	25,000	100.60
First Nat. Bank.	Petrolia, Ont., Debentures.	4½ per cent. s. a.	1-19 Ser.	17,426	103.90
Stimson, G. A., & Co., Toronto.	Hancock, Mich., School Dist.	4 per cent. s. a.	20	15,000	104.00
Superior Savings Bank, Local.	Cherryvale, Kan., Water Works.			49,000	100.480
Unknown.	London, Ont., Cons.	3½ per cent.		68,000	97.23
Bank of Montreal.	Buffalo, N. Y., City.	3 per cent. s. a.		6,989	Par.
City Controller.	New York City, Corporate Stock.	3½ per cent. s. a.	34¼ Avg.	5,885,000	104.277
Fisk, Harvey & Sons, New York.	Cincinnati, O., School.	3 per cent. s. a.	39	50,000	101.134
Vermilye & Co., New York.	Johnstown, Pa., Refunding and Building.	3½ per cent.	5-30 Opt.	130,000	101.15
German Nat. Bank, Cincinnati.	London, Ont., School.	4 per cent.		17,000	106.80
Johnston Savings Bank.	London, Ont., Sewer.	3½ per cent.		30,000	95.00
Merchants' Bank of Canada.					
Merchants' Bank of Canada.					



- 671,923—Bridge Superstructure. Richard Petersen Elberfeld, Germany.
 671,925—Excavating Machine. Dillon H. Snyder, Toledo, O., assignor of one-half to Charles M. Harrison and Nathan Babcock, Napoleon, O.
 671,946—Electrolytic Water Purifying and Filter Apparatus. Charles E. Holland, New York.
 672,003—Water Filter. Elmore P. Lynn, Cincinnati, O.
 672,039—Excavator. George W. King, Marion, O.

- 672,164—Hose Pipe or Nozzle. Cornelius Callahan, Canton, O.
 672,180—Hose Coupling. Robert W. Read, Brooklyn, N. Y.
 672,206—Fire Escape. Albert J. Dodd, Lincoln, Neb.
 672,229—Apparatus for the Purification of Water or Other Hygienic Purposes. Jean M. A. Lacomme, Brooklyn, N. Y., assignor of one-half to Walter Lauder, same place.
 672,230—Apparatus for the Purification of Water. Jean M. A. Lacomme, Brooklyn, N. Y., assignor of one-half to Walter Lauder, same place.
 672,231—Device for the Purification of Water. Jean M. A. Lacomme, Brooklyn, N. Y., assignor of one-half to Walter Lauder, same place.
 672,242—Heat Utilizing Garbage Furnace. John C. H. Stutt, Oakland, Cal.
 672,544—Fire Escape. John Woodruff, Elmgrove, W. Va.
 672,592—Filter Press. Richard C. Congdon, Philadelphia, Pa.
 672,593—Device for Cleaning Sewers. Michael T. Connolly, Jersey City, N. J.
 672,614—Plant for Disposal of Sewage. Joseph Danner, Scranton, Pa.
 672,623—Fire Escape. Joseph Jennings, Liberty, N. Y.
 672,681—Pavement for Driveways. William A. Mundy, Philadelphia, Pa.
 672,694—Apparatus for the Manufacture of Illuminating Gas and Coke.

672,704—*Dumping-Wagon*. William J. Hall, New York.
 672,709—*Machine for the Destruction of Weeds or the Like*. Carl Panten, Thammennham, Germany.
 672,822—*Sidewalk*. William L. Caldwell, New York, assignor of two-thirds to John W. Rapp and Henry Loy Easton, same place.
 672,825—*Gas Street Lamp*. John Franklin, Norwood, Ohio.
 672,846—*Water Filter*. Allen W. Bodell, Chicago, Ill.
 672,861—*Street Lamp*. Victor H. Slinack, Philadelphia, Pa., assignor to Pennsylvania Globe Gas Light Company, same place.
 672,865—*Reflector for Street Lamp*. Russell Thayer, Philadelphia, assignor to Pennsylvania Globe Gas Light Company, same place.
 673,398—*Filter or Strainer for Well-Tubes*. Anthony Keller and Michael Jeffers, Plymouth, Ind.
 673,423—*Tooth for Excavator Bucket*. Andrew M. Cupples, Tyrone, Pa.
 673,431—*Water Meter*. Henry Frederick, Newark, N. J.
 673,567—*Electric Transformer*. Louis M. Pignolet, Orange, N. J.
 673,597—*Pressure Water Filter*. Charles Diehl, Philadelphia, Pa.
 673,666—*Hydrant*. John J. Sullivan, Holyoke, Mass.
 673,674—*Auxiliary Valve for Hydrants*. William H. Baker, Trenton, N. J.
 673,713—*Spark Discharging Device for Electric Lighting for Gas Burners*. Paul Hoffman, Charlottenburg, Germany.
 673,734—*Street Sweeper*. Giovanni B. Siccardi, Washington, D. C.
 673,735—*Street Car Fender*. Arthur L. Siegel and James St. J. Lambe, St. Louis, Mo.
 673,756—*Nozzle*. Thos. F. Burke, New York, N. Y.
 673,793—*Voting Machine*. William R. Cunningham and Thomas Major, Frankfort, Ind.

Construction and Supply

SANITARY GARBAGE WAGONS.

ON the important question of most suitable vehicles for handling garbage, the president of the Brooklyn Sanitary Co., which has the New York contract for that borough, says: "The wagons in use for collecting garbage in Brooklyn previous to 1896 were wooden trucks pivoted on the hind axle, throwing all of the load on the rear wheels, and were equipped with folding wooden covers. We purchased and have used for over four years forty-four Shadbolt garbage trucks, half being made with iron and half with wood bodies. The iron bodies have caused much annoyance from leakage, caused by the acids eating around every bolt and rivet; the wood bodies have remained water-tight.

"The peculiar construction of the Shadbolt truck gives a water-tight body, a load properly adjusted on both axles, which allows us to have a one-third larger load than previously carried, and the truck lumps its load with ease.

"We consider an oiled canvas cover the best, being cleaner, out of the way in loading and unloading—in dumping a solid cover is continually being broken."

FUEL ECONOMIZER.

THE Orvis Down-Draft Boiler and Furnace Company, which recently successfully emerged from six years' litigation concerning patents, has leased the entire seventh floor of 277 Broadway, New York, corner of Chambers street, where it has exceedingly attractive and commodious quarters for its several departments. The Orvis Company's patents are of demonstrated merit in the saving of fuel, figures showing a margin of from 25 to 50 per cent. under different conditions. The Orvis Company has figures covering a period of six years' application and use of its devices by the Chicago Water Works, showing a saving in fuel of 24½ per cent. when applied to a tubular boiler, and of 36 per cent. applied to a Babcock & Wilcox boiler. The fuel saving down-draft devices may be applied to almost any type of boiler with unvarying success from every standpoint of efficiency and economy, as shown by figures and flattering testimonials on file at the company's office from concerns who have used them.

The Orvis Company is now installing furnaces for the Citizens' Water Company of Newtown, L. I., and backed by abundant resources and under the management of enterprising officers will, without a doubt, make a general acquaintance with the superior merits of these valuable devices insure the enterprise of being an enormous financial and commercial success.

The officers of the Orvis Down-Draft Boiler and Furnace Company are: George S. Terry, president; William H. Kimball, treasurer; O. D. Orvis general manager and inventor; and Frederick G. Calhoun, general superintendent.

A STRONG COMBINATION.

THE Bullock Electric Manufacturing Co., of Cincinnati, and the Wagner Electric Manufacturing Co., of St. Louis, have effected a combination of their selling organizations.

By thus combining forces in the field, they are mutually benefited, inasmuch as the products of the two companies are totally different, and where the product of one is used, the other is likely to be necessary.

The product of the Bullock company consists of a complete line of direct and alternating current machines, from a one-half horse power motor to a 10,000 K. W. generator; controllers of various types and rotary transformers. The Bullock "Teaser" power system for driving large daily newspaper presses has become world famous, and is today installed in the press rooms of the leading dailies in Europe and America.

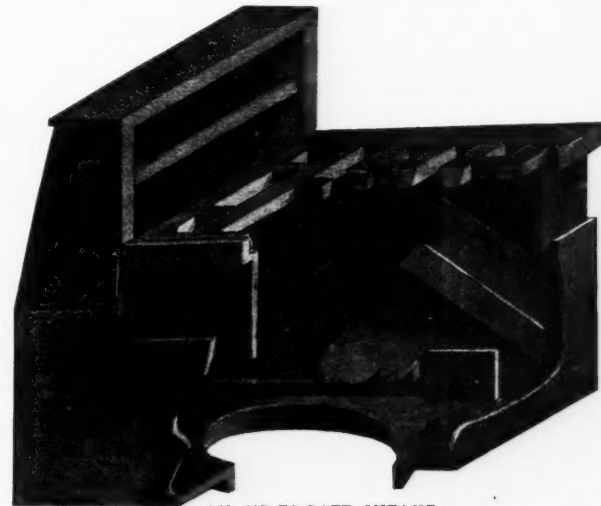
The product of the Wagner Electric Manufacturing Co. covers a full line of static transformers of all types and of the largest sizes; ammeters, voltmeters, indicating wattmeters, switches, switchboards for all purposes and single phase self-starting alternating current motors. The entire absence of complicated starting mechanism especially adapts the Wagner single phase motor to pumping plants and machinery of like character.

Thus it will be seen that the two lines are admirably adapted to be sold by one organization, which will be under the management of Mr. E. H. Abadie, formerly sales manager of the Wagner company.

UP-TO-DATE DRAINAGE GOODS.

CAREFUL observation has led to the discovery that the old style "curb intake" and "lawn cover" type of basins have proven wholly inadequate in effecting a perfect drainage, their construction allowing of but a limited amount of space for waterway, corresponding to the depth of the curb. Where the height of the curb, above the pavement is but from four to seven inches, it becomes necessary to depress the pavement at, and widen, the mouth of the intake, in order to obtain sufficient area for the flow of water and accordingly the contour of the roadway or pavement must be broken at this point. Investigation has shown that this construction is a source of danger to the public.

It is obvious from the foregoing that a perfect form of drainage goods must be constructed on scientific principles. Working on a new and correct principle, the American Municipal Supply Co., Cleveland, Ohio, has devised a form of adjustment that will com-



AN UP-TO-DATE INTAKE.

mend itself to the most skeptical. No dependence is placed on frictional contact of surfaces, nor on bolts, levers, slots or series of holes and pins. Levers and ratchets are too complicated and bolts are not serviceable. Holes drilled or cast weaken a casting. Knowing this and believing the engineers will, with one accord, agree with us, this company has constructed its adjustable appliance from solid metal, so arranging it that a perfect bearing between two surfaces is not only obtained, but maintained throughout the lifetime of the casting.

TWENTIETH CENTURY AIDS TO COMMERCE.

ONE of the most striking illustrations of the intimate relations existing between American railroads and all other commercial interests, is set forth in the "Pan-American Series" of postage stamps issued by the Postmaster General May 1, 1901.

This series also demonstrates the commanding position of the New York Central and the fact that it is in touch with and an integral part of the commerce of the world.

The Pan-American series of postage stamps consists of six beautiful steel engravings printed in two colors producing the effect of a framed picture. Each of these stamps represents what is styled an "aid to commerce," and, curiously enough, and without any design on the part of those who planned the series, each subject is associated with the New York Central.

The two-cent stamp is a picture of the New York Central's "Empire State Express," from a photograph by A. P. Yates, of Syracuse, taken when the train was running sixty-four miles an hour.

The four-cent stamp represents an automobile of the same style as those used in the New York Central cab service at Grand Central station, New York.

STUDEBAKER EXHIBITS AT THE PAN-AMERICAN.

THE Studebaker Bros.' Manufacturing Company, of South Bend, Ind., have four exhibits at the Pan-American Exposition, all of which will interest the city official who attends the great fair. The first is in the Ordnance Building, where is displayed army wagons, ambulances, officers' wagons and such as are used by the United States Government. One in the Stadium, where will be found the Studebaker farm wagon, which has stood the test for half a century, and other vehicles for use on the farm and elsewhere. The general headquarters of this enterprising firm are located in the Transportation Building, where visitors are promised every attention that courtesy and good-will can give.

The most practical exhibit of this company will be found in the products of this manufacturer which are in daily use by the managers of the Exposition. These include, among other items, six vertical spray sprinklers and a number of "gem junior" push-cart sprinklers. By observing the work of these the city official who visits the Exposition will be able to carry away with him an object lesson of the effectiveness of the work performed by the Studebaker sprinklers.

WATER STORAGE.

To obtain a source of supply of pure and wholesome water is the first and most important step in the construction of a water plant. The character and condition of water taken from its original source may be above suspicion, yet when removed from such, and artificially stored under the influence of light, heat and atmosphere, a rapid change takes place. The storing of water in the usual open receptacles, such as reservoirs, tanks and stand pipes, when exposed to these influences has been subject to much discussion. The impracticability of storing when so exposed and preserving its original purity and wholesomeness has been clearly demonstrated, notably at Brookline and Newton, Mass., and more recently at Brooklyn, N. Y. On the latter an extended report was made by Professor Albert R. Leeds, of Stephens Institute, and I. M. De Verona, C. E., in charge of Brooklyn water supply.

Under the patents of William E. Worthem, C. E., and Oscar Darling, C. E., the Acme Water Storage and Construction Co., whose headquarters are at 15 to 21 Park Row, New York City, will furnish a system of supply and storage by which it is enclosed in air-tight receptacles and by which water is guaranteed to possess its original purity. The system is in practical operation in Babylon, Suffolk County, N. Y., and in the village of Southampton, Suffolk County, N. Y., and the authorities and residents there and elsewhere regard the system very highly as to its general efficiency and its practical working.

A handsome catalogue bearing fully on the subject, with cuts and illustrations, or any other information, will be cheerfully furnished on application to the company.

WHAT WE OFFER.

THERE are numerous openings along the Southern Railway that are at this time particularly attractive. They embrace quite a variety of pursuits. There are numerous areas of timber lands, either in large or small tracts, which await development; also some good mineral properties that are bargains. We have several good openings for planing mills, wood working and furniture factories; several towns that desire ice plants and electric light plants; good openings for clothing factories, and other industries; farm openings for every line of agriculture, including truck raising, fruit growing, dairying, stock and poultry raising, etc. If you are experienced in any line of manufacturing and are anxious to secure a new location, write us about what you desire, and undoubtedly we will be able to point out some place on the Southern Railway that will fill the requirements.

MODEL HOTEL EQUIPMENTS.



IN the model hotel or apartment house of to-day, telephones are quite as necessary as the elevators and mail chutes. After many unfavorable experiences, architects, engineers and contractors have gradually discarded the cheap and inefficient telephone apparatus and are choosing more for quality and durability than price. For these reasons the New Hotel Essex at the northwest corner of Fifty-sixth street and Madison avenue, New York city, is equipped with genuine Ericsson telephones and switchboard, which give quick communication from every suite and hall to the office, and place the management within easy reach of every patron. The room telephones are all of the Hand Microtelephone pattern, as shown in the accompanying

illustration, and instead of being a disfigurement to the wall, they serve as an ornament to the finely finished suites. Each of these is fitted with a flexible cord of sufficient length to enable the patron to call the office, or to answer a call if desired, without rising from the couch or bed. When through using the releasing of a lever in the handle makes and breaks all necessary connections, and it is not necessary to replace on a hook, as in ordinary telephones. When first introduced, the Hand Microtelephone was considered a curiosity, but its utility and compactness has made it a great favorite, and it bids fair to soon take the place of the once popular nickel desk set, and in many cases replace the wall instrument as well. In operation, the office is called by simply pressing the contact in the handle of the Hand Microtelephone, which act throws the drop at the switchboard. The operator connects in the usual manner, answering the call, and if desired calls some other suite and enables the two to converse. The call to the suite is made by a small musical gong placed near the ceiling, which, while loud enough to call a person, is not harsh enough to disturb one.

In addition to this system, the Ericsson Telephone Co., 296 Broadway, New York, make a number of different systems and telephones of special design and finish for special uses, including intercommunicating patterns and for exchange use. If you are interested, you will do well to write them.

IMPROVED COTTON RUBBER LINED HOSE.

"THERE used to be some fault found with cotton hose, but the improvements which have been made within the past few years have placed cotton rubber-lined hose in the lead for fire purposes," said a well-known fire chief the other day.

There are scores of chiefs who recommend the hose manufactured by the Chicago Fire Hose Co., 54 La Salle street, Chicago. The up-to-date chief will be glad to avail himself of the opportunity afforded, by the courtesy of this firm, to examine and test the quality of its

hose; they will send a sample, with particulars and testimonials, as to durability, quality, tests, etc., to anyone who will send his address.

The so-called "friction loss" has been remedied by the production of a perfectly smooth waterway in the seamless tube made by this company. This fault was overcome by an expensive series of experiments.

Another fault was overcome by calendering the lining in two separate sheets and vulcanizing the two together, thus overcoming the possibility of producing a "pin-hole" lining.

A third improvement is shown by the manner in which the rubber lining is attached to the fabric. The adhesion is so perfect that it is practically impossible to detach it even by physical force. Any possibility of the lining becoming detached from the cotton is absolutely precluded.

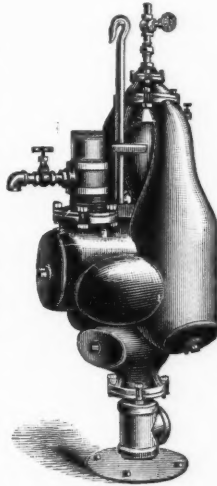
THE PULSOMETER STEAM PUMP.

LIKE all great inventions which have inaugurated a new departure in applied science, the pulsometer steam pump has been much imitated, and since its first public exhibition in 1870 imitators have periodically appeared which, while professedly embodying the principles then disclosed, have without exception failed to secure that degree of efficiency and general adaptability to all kinds of uses for which the genuine pulsometer has become so justly famed.

Years of practical work with the pulsometer, under widely different conditions, have demonstrated the merits claimed for it, in the most striking manner and carefully conducted expert tests, made at Stephens Institute of Technology, have given figures for economy of performance, which firmly established its high rank of excellence among that class of water raising machinery with which it was designed to compete. The pulsometer requires no special foundation, and if it be desired to place in a stationary position a stand can be applied as illustrated here:

In a suspended position a hook is used, such as in sinking wells and shafts, in connection with sewers, coffer-dams, excavating operations, in fact anywhere it is impracticable to provide a foundation for a pump. The pulsometer may be hung from a projected beam, pole or tripod and arranged with suitable tackle to be raised or lowered at will. For use in drainage, excavations, sewerage work, sewage plants, artesian or driven wells the pulsometer stands without a peer and makes friends wherever it is used.

The Pulsometer Steam Pump Co., with offices at 135 Greenwich street, New York City, has just completed a very finely illustrated catalogue, showing the different uses for which it is especially adapted, also giving some very valuable information and tables on steam, water, friction of water in pipes, pressure and much other useful data of great interest. It will be mailed free to any address on application for "illustrated catalogue of 1901," and its appearance is certainly a credit to the enterprise and up-to-date character of the "Old Pulsometer Firm."



TRADE NOTES.

—The Hersey Manufacturing Co. has been comfortably housed in its new New York offices, 220 Broadway, since the first of May.

—The city of Cleveland has just purchased a new combination hose wagon for the fire department, from the Seagrave Company, of Columbus, Ohio.

—E. P. Browning, the "Minneapolis hustler," recently sold a new truck made by the Seagrave Company, of Columbus, Ohio, to the city of Crookston, Minn., which has given eminent satisfaction.

—A resident of one of the cities in British India, in a communication to the Ericsson Telephone Co., 296 Broadway, New York, says: "The Ericsson telephone sets are the best in the world and we use them here." This is another evidence of the world-wide prosperity of this well-known concern.

—The Standard Roller Bearing Company, 2326 Market street, Philadelphia, Pa., has increased its capital stock to one million dollars and its facilities for the manufacture of wagons and carriage axles, automatic axles, running gear and roller bearings for all classes of machinery will be largely increased immediately.

—The Boulevard Globe and Lamp Co. is now settled in its new home, 136 Liberty street, to which place the company moved on May 1. A recent booklet containing full information about the products of this prominent manufacturer will be sent upon application, as well as estimates for any proposed work.

—About as pleased a lot of "fire laddies" as you can find anywhere are the members of the C. H. Kavanaugh H. & L. Co., of Waterford, N. Y. They recently put in a new truck made by the Seagrave Company, of Columbus, Ohio, and it is no wonder they are pleased! When it comes to pleasing the "boys" the Seagrave Company is "it."

—The Bullock-Wagner Sales Organization has established a district office at 1624 Marquette building, Chicago. It will be in charge of Mr. H. B. Foster, who has served the Wagner Company for about two years as sales agent. He will have the able assistance of Mr. F. W. Goldschmidt, formerly of the Western Electric Company, in covering this most important field.

—In Government work the Lundell motors and generators, manufactured by the Sprague Electric Co., are used to a very large extent. Recent orders include seventeen motors of various sizes for the Norfolk Navy Yard; three 35 H. P. motors for the Mare Island Navy Yard; four motors for the Boston Navy Yard, to be used on metal working machines furnished by George A. Ohl & Co., and five motors, one generator and a 2 K. W. ventilating set for the Brooklyn Navy Yard. In addition to the Government orders the Sprague Electric Co. reports the following among its large sales: Steelton Light and Power Co., one 125 K. W. belted type generator; Columbia University, three 75 K. W. engine type generators; C. S. Ashley, one 125 K. W. generator; Pittsburg Reduction Co., one 25 H. P. motor and one 166 H. P. motor; National Meter Co., one 37½ K. W. engine type generator; Chase Rolling Mill Co., one 125 K. W. belted type generator, and the Evansville Gas and Electric Co., one 150 K. W. generator.

TRADE PUBLICATIONS.

—Embossed gilt letters on a cream leatherette cover serve well to call attention to the catalogue of the Pacific Flush Tank Co., which especially sets forth the merits of their intermittent flush tanks.

—Sipe & Sigler, Cleveland, Ohio, hand us their catalogue concerning the Willard Storage Battery. Much useful data is given showing the capacity of these cells.

—The Hays Manufacturing Co., Erie, Pa., might well ascribe to their catalogue "B" the added title of Everything for the Public Works Man. City waterworks especially should have this catalogue on file.

—The Indiana Road Machine Co., of Ft. Wayne, Ind., sends us its catalogue, which is replete with information concerning road-making machinery. They manufacture road graders, stone crushers, road rollers, road plows, etc.

—To one not familiar with the process of garbage cremation, the catalogue of the Dixon Garbage Crematory Company, of Toledo, Ohio, will come as a help in the way of information. From the cuts a fair idea of the process may be had.

—The American Municipal Supply Co., Cleveland, Ohio, are making a class of goods which largely meet the requirements of a city's sewerage system. The cover of their catalogue reads, "Standard Adjustable Drainage Goods," and we are of the opinion that the word "Standard" is used advisedly.

—Catalogues Nos. 1 and 2 of the Raymond Bros. Impact Pulverizing Company, of Chicago, Ill., have just come to our desk. After looking them through we are of the opinion that their machinery is capable of rendering any refractory substance to that degree of smallness which anyone would feel were he to purchase any of this class of machinery without first looking over the Albert Raymond Roller Mill or the Automatic Pulverizer.

THE MANAGER'S CHAIR

In presuming to break the established custom among publications, and to say a few words to the readers of THE MUNICIPAL JOURNAL AND ENGINEER the manager offers no apology. He believes it a duty due to the readers, and the advertisers as well, to call attention to the advertising pages of this issue. There is much to be learned in looking through these pages, where progressive manufacturers call attention to their latest devices or improved methods.

To advertise in a magazine like THE JOURNAL is pretty strong evidence that the article or proposition, whatever it may be, possesses merit and that the advertiser believes in it, else he would not pay out good money to tell you of it. You will find these pages both instructive and interesting.

Turn, for instance, to the advertisement of the Browder Life Saving Net on page 11. This simple device saved the lives of twenty people at one fire in New York on the night of May 7, some of the people jumping from the top of a six-story building. Every large factory should have one of these nets within easy reach.

Another great Life Saver is the Providence Car Fender shown on page 4, and is in use on the principal street railways of the world.

The Christensen Air Brake for Electric Cars, as shown on page 5, has also a great record as a Life Saver, as it gives to the motorman almost perfect control of his heavy car. The company's plant in Milwaukee is one of the finest manufacturing plants in this country.

Other devices that might be classed under the heading of Life Savers are the Emergency Fire Escape, shown on page 12, and the "Rex and the Diggs" Fire Extinguishers on page 11.

The Chicago Fire Hose Company tells about its Seamless Rubber Lined Hose on page 9, and the W. J. Clark Company use page 8 to call attention to its ideal hose coupling, well named "Quick-as-a-Wink." The couplings and fittings are made for every size of hose. To try them is to adopt them.

The Adams-Bagnall Electric Company use page 7 to call attention to the well-known A. B. Arc Lamps, which are extensively used in Municipal Lighting.

The General Electric Company, the Ball, the Sprague and the Bullock Electric Companies, whose notices appear on pages 1, 3 and 5, furnish apparatus for municipal lighting work and would be glad to send catalogues and any information relative to their respective apparatus.

The Studebaker Brothers' Manufacturing Company has an interesting page, illustrating its sprinklers and sweeping machines. A visit to the company's exhibit at the Pan-American would well repay you.

Warren Brothers' Company has nine interesting pages describing and illustrating its work in the way of bituminous macadam pavements, bituminous and asphalt sidewalks, etc. The organization of this company is made up of experts on the subject of paving and in the use of asphalt, coal tar and cement.

The International Water Filtration Company on page 32 tell of the newest and most efficient method of purifying domestic waters.

The American Municipal Supply Company has a very interesting catalogue on its various specialties, including sewer inlets, catch basins, etc. Its sewer inlet type D is illustrated on page 33.

The ordinary rough manhole covers are particularly undesirable in asphalt pavements, especially so while iron-tired wheels are in use. The Greger Manufacturing Company overcomes this objectionable feature and manufacturers an asphalt filled cover that is as noiseless as the pavement itself. See advertisement on page 33. Its catalogue makes interesting reading.

The Shadbolt Manufacturing Company print on page 37 some splendid testimonials from users of its Dumping Wagons. The company has just issued a new catalogue and will send one on request.

There are numerous other interesting facts to be gleaned by a careful perusal of the advertising pages of THE JOURNAL. You will notice that we have placed at the bottom of each advertising page an index of the advertising directory. A request for printed matter will be cheerfully responded to by any of our advertisers.

If you will always kindly mention THE MUNICIPAL JOURNAL AND ENGINEER when writing to advertisers, it will be greatly appreciated by

THE MANAGER.



For { **Fire Engines**
Chemical Engines
Hook and Ladder Trucks
Hose Carts

NO Joint Parting
Creeping ∴ ∴

Is firmly anchored to the rim.

Outwears all others.

Made in sizes from

2½ inches to 7 inches.

Write for catalog

and prices. ♪ ♪

THE GOODYEAR TIRE & RUBBER CO., AKRON, O., U. S. A.

MUNICIPAL JOURNAL AND ENGINEER

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SPECIAL FEATURES

Buffalo's Famous Water Works
Mayors Talk on Municipal Ownership
Hamilton's Tar Pavements Go to Pieces
Gas Profits Relieve English Taxpayer
Good Roads Exposition on Wheels
Jamestown Meeting of L. A. M.
Municipal Oddities
Modern Brick Pavement Construction
Municipal Bond Sales for May
Cleveland's Noted Mayor
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Common Sense in Street Lighting
A Year's Municipal Activities
Municipal Accounts of Chicago
Mt. Prospect Laboratory
The Testing of Portland Cement

Vol. X No. 6

June, 1901

SINGLE COPIES 25 CENTS

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Publishers MUNICIPAL JOURNAL AND ENGINEER
253 Broadway, NEW YORK CITY

GENERAL ELECTRIC COMPANY,

SCHENECTADY, N. Y.

Complete Electrical Equipments

FOR

Railway, Power, Lighting,

NEW YORK OFFICE,
44 Broad Street.

SALES OFFICES,
in all Large Cities.

WENDELL & MacDUFFIE, 26 CORTLANDT STREET,
NEW YORK, U. S. A.

CORPORATION PURCHASING AGENTS—STEAM and ELECTRIC RAILWAY SUPPLIES.

Falk Cast Welded Joints, Gears and Pinions—Taunton Snow Plows, Sweepers, Sprinkling Cars and Transfer Tables—Rochester Car Wheels—Jerome Metallic Packing—Bosley Weather Strips—Open Hearth Steel Castings.

CORRESPONDENTS FOR EXPORT TRADE

NEW YORK CAR WHEEL WORKS,

MANUFACTURERS OF

"Machined" Chilled Wheels for Steam and Electric Service.

400,000 Tramway Wheels Furnished in the Last 10 Years.

Fitting Shops: 29 BROADWAY, NEW YORK.

Main Office and Works: BUFFALO, N. Y.

J. G. BRILL COMPANY,

TWO
GRAND PRIZES
Paris 1900

PHILADELPHIA, U. S. A,

17 Victoria Street, S. W. London, England.

... BUILDERS OF ...

CARS AND TRUCKS FOR ELECTRIC RAILWAYS.

Our System is Complete for Every Possible Electric Service.

BALL ARC DYNAMOS FOR MUNICIPAL LIGHTING

SEPARATE CIRCUITS

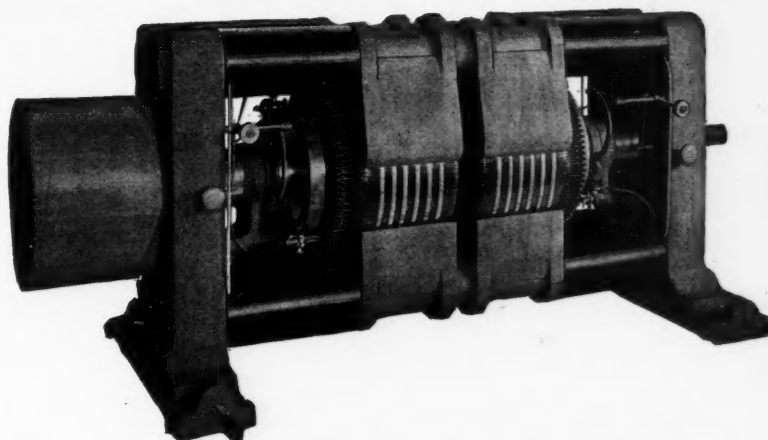
ALL SIZES AND WINDINGS.

2½, 3, 4¼, 5, 6.6 and 9.6 amperes.
Voltages from 1,000 to 9,600.

**AUTOMATIC,
HIGHEST EFFICIENCY,
LOWEST TEMPERATURE.**

Series Enclosed Lamps.

Maximum Quantity of Effective Light, Burning 100 to 130 Hours
with One Trimming.

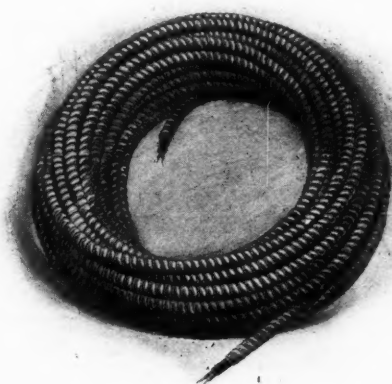


INDEPENDENT COMPANY. INDEPENDENT PRICES.

Write for Information and Bulletins.
Please mention this Publication.

BALL ELECTRIC CO., 404 W. 27th Street,
NEW YORK CITY.

ESTABLISHED 1882.



OUR NEW

Flexible Steel Armored CONDUCTORS

represent the latest and most radical advance in the art of electric wiring. Their use reduces the installation to an absolute simplicity. There are no elbows required. There is entire flexibility, a high grade of insulation and perfect protection against mechanical and

other injuries. The Steel Armored Flexible Cord for pendants and portables is very desirable for use in factories, mills, machine shops, engine and boiler rooms, etc., where ordinary cord is impracticable or is positively forbidden.

These products are of the greatest importance to Architects, Engineers and Electrical Contractors. Send for Catalogue No. 5404.

SPRAGUE ELECTRIC COMPANY,

General Offices: 527-531 West 34th Street, New York.

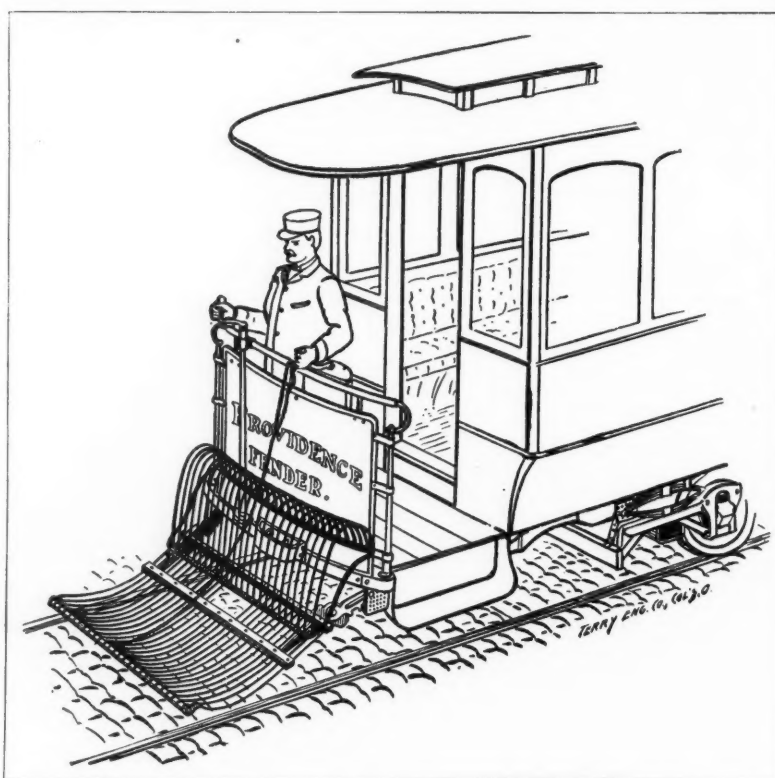
CHICAGO, BOSTON, ST. LOUIS, BALTIMORE,
Fisher Building. 275 Devonshire St. Security Building. Guardian Trust Building.

PROVIDENCE CAR FENDERS SAVE HUMAN LIVES.

Ninety-five per cent. of all car fenders used in the world, other than those made by electric roads themselves, are Providence Fenders.

PROVIDENCE FENDERS

are in practical operation on more than 7,500 cars operated on 115 electric roads in 200 cities and towns in the United States, South America and Europe.



There is no expense spared, either in material or labor, to make the PROVIDENCE FENDER the BEST LIFE SAVING DEVICE ever attached to an electric or cable car. In fact, it is the only car fender made that, when properly used, saves 100 per cent. of all lives placed in jeopardy.

MANUFACTURED BY

THE CONSOLIDATED CAR FENDER CO.

39 CORTLANDT ST., NEW YORK.

FACTORY, PROVIDENCE, R. I.

Bullock Electric Mfg. Co.,
CINCINNATI, U. S. A.

Wagner Electric Mfg. Co.,
ST. LOUIS, U. S. A.

*Direct and Alternating Current Equipments
for Electric Light and Power.*

237

Another Reason

why Bullock Generators and Motors are best is because they have laminated armature and pole cores. By this construction an exact knowledge of every part of the metal is obtained. No blow holes, sand or other defects in the metal of Bullock machines. Send for our descriptive bulletins.

Bullock Electric Mfg. Co.,
CINCINNATI, U. S. A.

255



ESTIMATES FURNISHED
CONTRACTS EXECUTED

TELEPHONE CALL
1515 CORTLANDT

Electric Fountains

ARE ALWAYS POPULAR.

We Build Every Description

WITH and WITHOUT **ELECTRICITY.**

Darlington Electric Fountain & Supply Co.,

REAL ESTATE BUILDING, PHILADELPHIA, U. S. A.

CHRISTENSEN AIR BRAKES

absolute control of his car. Accidents are thereby avoided.

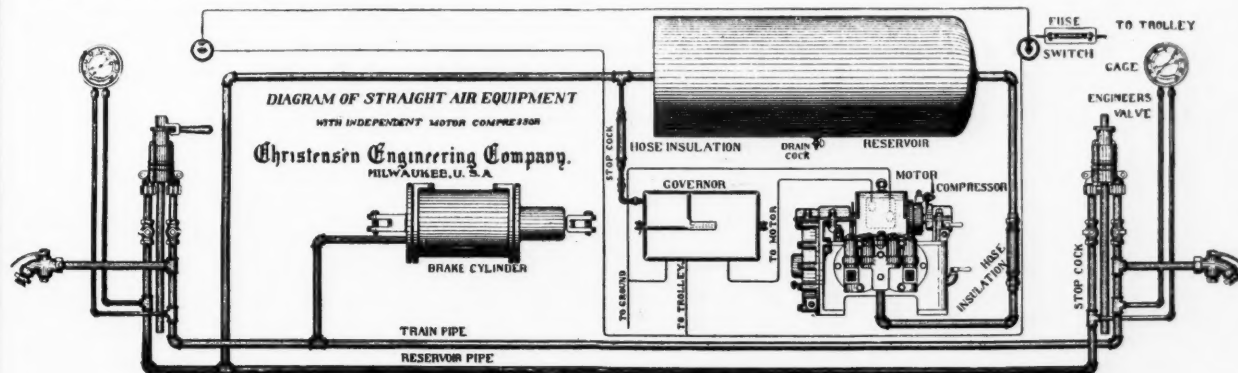
Christensen Air Brakes are made in various sizes and types for every service ranging from a small car to an elevated train. Adopted by many of the best electric railways in America and Europe. Largest plant in the world devoted to this business.

are not required on HORSE CARS, but no other brake is suitable for, or will properly control,

ELECTRIC CARS

with their increased size, weight and speed.

They enable the motorman to have quick and



Many times
more
Christensen Air
Brakes in
use than all
others
combined.

Christensen Engineering Company,
Manufacturers of Air Brakes. **MILWAUKEE, U. S. A.**



Contractor's Drainage Sewerage PUMPS
Handling Dirty, Grity and Sandy Liquids without Wear, Oil or Care. Pumping Outfits for Contractors, Mining, Irrigating, Railroad, Quarry, Drainage and Manufacturing purposes. Second hand Engines, Boilers, Pumps and other Machinery always on hand. Exchanging.

MASLINS, 165-167 First St., Jersey City, N. J.

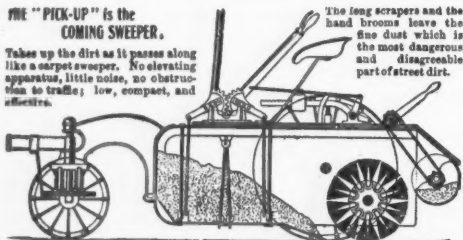
RUBBER COTTON, etc. HOSE

Fire, Lawn, Garden, Precautionary or other; with full Rubber Line. Temporary or permanent agencies offered Free samples. Cash Commissions. \$5.00 Reward for first information of Fire Hose wanted.

MINERALIZED RUBBER CO.
18 CLIFF STREET, NEW YORK.

THE "PICK-UP" is the COMING SWEEPER.

Take up the dirt as it passes along like a carpet sweeper. No elevating apparatus, little noise, no obstruction to traffic; low, compact, and effective.



The Ironclad Two-Horse Street-Sweeping Machine.
ADDRESS H. B. WALKER, 208 S PINE ST., DAYTON, O.

T. N. MOTLEY CO.,

43 John St., NEW YORK.

Waring Ideal Bag Carrier

For Street Cleaning, prevents distribution of sweepings; saves time and money.

BUFFALO PUSHER

Asphalt Street Cleaner,

A most effective tool for cleaning pavements.

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A thoroughly practical technical education in any branch of Civil Engineering may be acquired by correspondence instruction. Among the courses is

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Conferred by
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and a number of other separate courses in all branches. Each begins with the simplest principles. Anyone of average intelligence can obtain a degree by doing the work of several of the courses without leaving home or interrupting other work. Terms for separate courses, \$30 and upward, cash or instalments.

Write for details, and illustrated circulars.

National Correspondence Institute
30-47 NATIONAL BANK BUILDING,
WASHINGTON, D. C.

Index to Advertisers.

For Buyer's Directory, See Page 36.

Acme Water Storage & Cons. Co.	34	Johnson, Isaac G. & Co.	32
Adams-Bagnall Elec Co.	7	Keasbey, Robert A.	5
Alexander, Bradley & Dunning.	31	Kelly, O. S. Co.	39
Alton Paving, Building & Fire Brick Co.	31	Kuichling, Emil	30
American Fire Engine Co.	10	Lake Shore & Mich. So. Ry. Co.	38
American Municipal Supply Co.	33	La France Fire Engine Co.	10
American Railway Supply Co.	36	Longyear, Orson C.	30
American Steel House Co.	39	Maslins	6
American Street Ry. Paving & Imp'vt Co.	31	McMurray, Eugene A.	30
American Vitriified Conduit Co.	32	Meacham & Wright.	31
Atwater, Henry W.	35	Meldrum-Morse Destructor Co.	35
Bacon Air Lift Co.	18	Mineralized Rubber Co.	6
Ball Electric Co.	3	Moore, E. F.	30
Bardwell Votometer Co.	13	Moore Manufacturing Co.	33
Blake, M. J. & M.	30	Motley Co., T. N.	6
Boulevard Globe & Lamp Co.	16	National Correspondence Institute.	6
Bridgeport Boiler Works Co.	35	New York Brick & Paving Co.	31
Browder & Co., T. F.	11	New York Car Wheel Works.	2
Buffalo Meter Co.	18	New York Cen. & Hud. River R. R.	38
Builders' Iron Foundry.	18	N. Y. Continental Jewell Filtration Co.	40
Bullock Electric Mfg. Co.	5	Nitro Powder Co.	36
Burgard, Henry P.	30	Okonite Co., Ltd.	40
Chicago Fire Hose Co.	9	Orvis Down Draft Boiler & Furnace Co.	34
Christensen Engineering Co.	5	Pacific Flush Tank Co.	33
Christian, G. L.	30	Pennsylvania Globe Gas Light Co.	17
City Wastes Disposal Co.	30	Pulsometer Steam Pump Co.	18
Clark Co., W. J.	8	Perkins, T. C., & Co.	30
Conard, W. R.	30	Potter, Alexander.	30
Consolidated Car Fender Co.	4	Pittsburg Meter Co.	18
Consolidated Rubber Tire Co.	39	Rand Drill Co.	18
Croes, J. J. R.	30	Reeds' Sons, Jacob.	12
Darlington Electric Fountain & Supply Co.	5	Rex Fire Extinguisher Co.	11
Darrach, Chas. G.	30	Seagrave Co., The.	10
Delaware, Lackawanna & Western R. R.	38	Selle Gear Co.	9
Diggs, D. W.	11	Shadbolt Manufacturing Co.	37
Ericsson Telephone Co.	36	Smith Premier Typewriter Co.	16
Emergency Fire Escape Co.	12	Southern Railway Co.	38
Erie R. R.	34	Sprague Electric Co.	3
Eureka Fire Hose Co.	9	Standard Water Meter Co.	18
Fabric Fire Hose Co.	40	Strock, S. C.	36
Fanning, J. T.	30	Studebaker Bros. Mfg. Co.	6, 15
Fire Extinguisher Mfg. Co.	9	Sugar, S. S.	30
Gamewell Fire Alarm Telegraph Co.	12	Tingley, Richard H.	30
General Electric Co.	2	U. S. Sanitary Co.	30
Globe Asphalt Co.	31	United States Street Cleaning Co.	14
Goodyear Tire & Rubber Co.	24	Walker, H. B.	6
Grant Axle & Wheel Co.	37	Walker, Robt. L.	35
Greger Mfg. Co.	33	Warren Brothers Co.	21, 22, 23, 24, 25, 26, 27, 28, 29
Gregory, Elisha	30	Welsbach Street Lighting Co.	17
Guisse Brick & Stone Co.	31	Wendell & MacDuffie.	2
Haggerty Refining Co.	12	White Manufacturing Co.	32
Herring, Rudolph, & Geo. W. Fuller.	30	Wiard Plow Co.	34
Holland & Co.	30	Wise & Watson.	30
Ingersoll-Sergeant Drill Co.	18	Yawman & Erbe Mfg. Co.	16
Int. Sewage Disposal Co.	35		
Int. Water Filtration Co.	32		
Iowa Engineering Co.	30		

THE STUDEBAKER

Celebrated Improved Patent Street Sprinklers



for sprinkling city streets, village, county and state highways, race tracks, speedways and boulevards. Also made in sizes suitable for sprinkling private grounds and golf links. Volume of water under complete control of driver, and fitted with latest device for controlling width of spread. Valves cannot clog up with dirt. Absolutely simple in construction. Send for catalogue.

Studebaker Bros. Mfg. Co.,

Broadway and Prince St., New York City.



For prices and full information, address,

The Adams-Bagnall Electric Co.,

77 Stanton Street,

CLEVELAND, OHIO.

INDEX TO ADVERTISERS ON PAGE 6.



A Push--It's Locked.

"Quick-as-Wink" hose couplers are made for fire departments that prefer to save life and property.

They are displacing slow, unreliable screw couplings as the trolley has superseded horse cars.

"Quick-as-Wink" Couplers

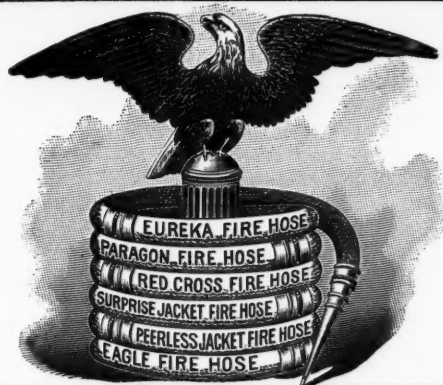
make a water-tight, unleakable connection between hose sections, steamer and hydrant in a second.

The joint can be turned and twisted, but won't separate until you want it separated.

With "Quick-as-Wink" Couplers most hose troubles vanish. There are no battered or crossed threads, no leaky joints. Instead a coupler to be depended on at all times and under every condition.

We'll meet you more than half way if you want to be convinced. Let us know. Send for booklet.

The W. J. Clark Co.,
SALEM, O.



Eureka Fire Hose Company,

No. 13 Barclay Street, NEW YORK.

The Original and Largest Manufacturers of

RUBBER LINED COTTON HOSE,

Sole Manufacturers of the Celebrated High Grade Brands of Seamless Woven Cotton, Mildew Proof and Rubber Lined

FIRE DEPARTMENT HOSE,

"Eureka," a Triple Hose, "Paragon," a Double Hose, "Red Cross," a Single Hose. MANUFACTURERS OF HOSE OF EVERY DESCRIPTION.

JACKET FIRE HOSE IN KNITTED OR WOVEN FORM.

FIRE EXTINGUISHER MANUF'G CO.,

325 South Desplaines Street, CHICAGO, ILL.

BUILDERS OF

Champion Chemical Fire Engines.
Babcock Chemical Fire Engines.
Combination Chemical Engines and Hose Wagons.

Champion Fire Extinguishers.
Fire Extinguisher Charges.
Hale Water Towers.
Champion Water Towers.

Babcock Aerial Hook and Ladder Trucks.
General Service and Village Hook and Ladder Trucks.
Babcock Fire Extinguishers.

Turret Nozzles or Deck Standpipes for Lumber Yards, Factories, Warehouses and Public Buildings.

Nozzles of All Kinds.

Three-Horse Hitches.

Steck's Electric Wire Cutters.

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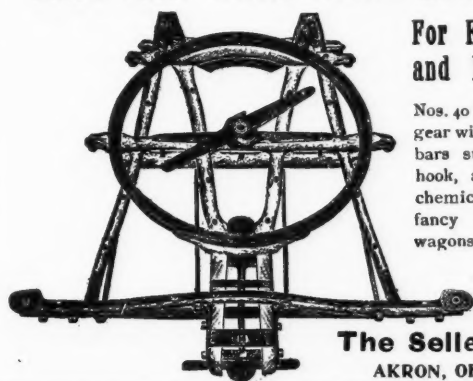
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"Waldron" Controlling Nozzle.

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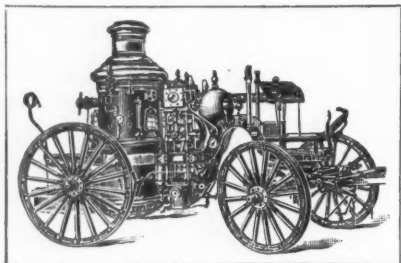
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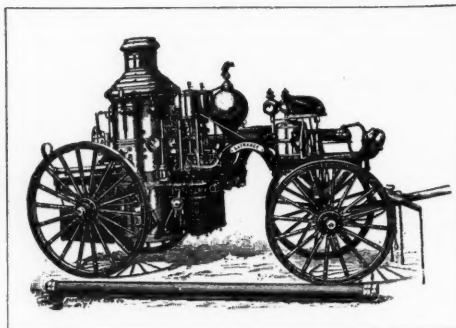
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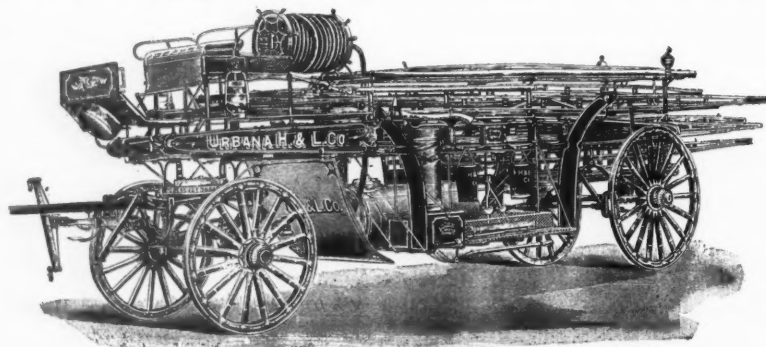
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347,648 August 17, 1886.
357,417 February 8, 1887.
581,776 May 4, 1898.
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613,848 November 8, 1898.
625,066 May 16, 1899.

631,541 September 5, 1899.
607,665 July 19, 1898.
814,499 April 18, 1899.
287,967 April 18, 1899.
287,968 April 18, 1899.
666,441 January 20, 1901.
666,442 January 20, 1901.

669,711 March 12, 1901.
64,139 September 30, 1899.
64,080 September 19, 1899.
62,665 February 16, 1899.
63,167 May 29, 1899.
61,433 October 19, 1898.
62,664 February 16, 1899.

60,396 June 21, 1898.
25,621 December 27, 1886.
70,098 February 5, 1901.
70,099 February 5, 1901.
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THIS IS THE NET THAT DID IT.
IT IS BROWDER'S LIFE SAVING NET.

It is the only perfect life saving canvas or net in the world. Persons leaping into it do not even receive a jar. The motion of the hangers take the jar off the person jumping and the people holding the escape. There is no rebound, the hangers counteracting the same. If these Nets were used by hotels, factories, workshops and fire departments, there would be no reason for the loss of human life by fire.

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SOME JUMPED FROM THE ROOF OF SIX STORY BURNING APARTMENT HOUSE.

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Some twenty persons jumped into the fire net and were saved by it at a fire that started late last night at 758 Lexington avenue, and spread both ways until the big flathouses, 756 to 782 inclusive, were ablaze.

Truck 16 with its new life net was quick to respond, and the net was spread on the Lexington avenue side of the building and fifteen persons jumped into it from the third floor. None of them was injured.

Three jumped into the net from the top of the six-story building and they all escaped without injury.

The hair of one of the women who jumped into the net was burning. She stood also in the window on the top floor, and when the firemen got the net in place she jumped into it in safety. As she was being taken from the net the firemen smothered the burning hair with their coats.

The new life net, which was adopted at the suggestion of Chief Croker, is circular and about twenty-four feet in circumference. It has a rim of metal, to which the net is attached by springs, to take up the force of impact of a falling body. It was manned at first last night by six firemen, who had no trouble in holding the men and women who jumped into it. The six firemen were afterward reinforced by as many policemen.

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get out of
Repair.

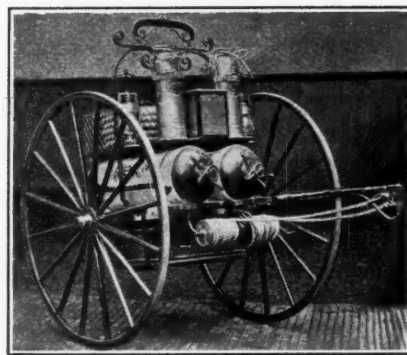


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Chemical Engines.
Combination
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50 Feet.



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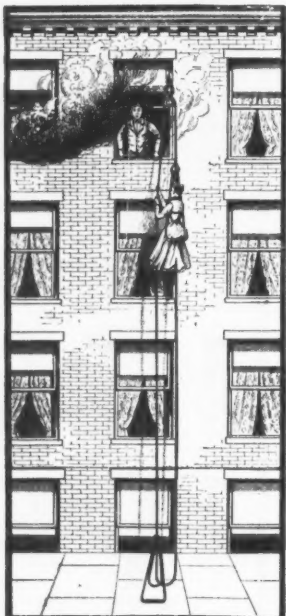
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Particular Attention is called to our Storage Battery and
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SCIENTIFIC, PRACTICAL, ECONOMICAL. THEY HAVE DEMONSTRATED
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Balances One's Weight.



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Don't Wait for Another Dangerous Fire. BE ON THE SAFE SIDE.

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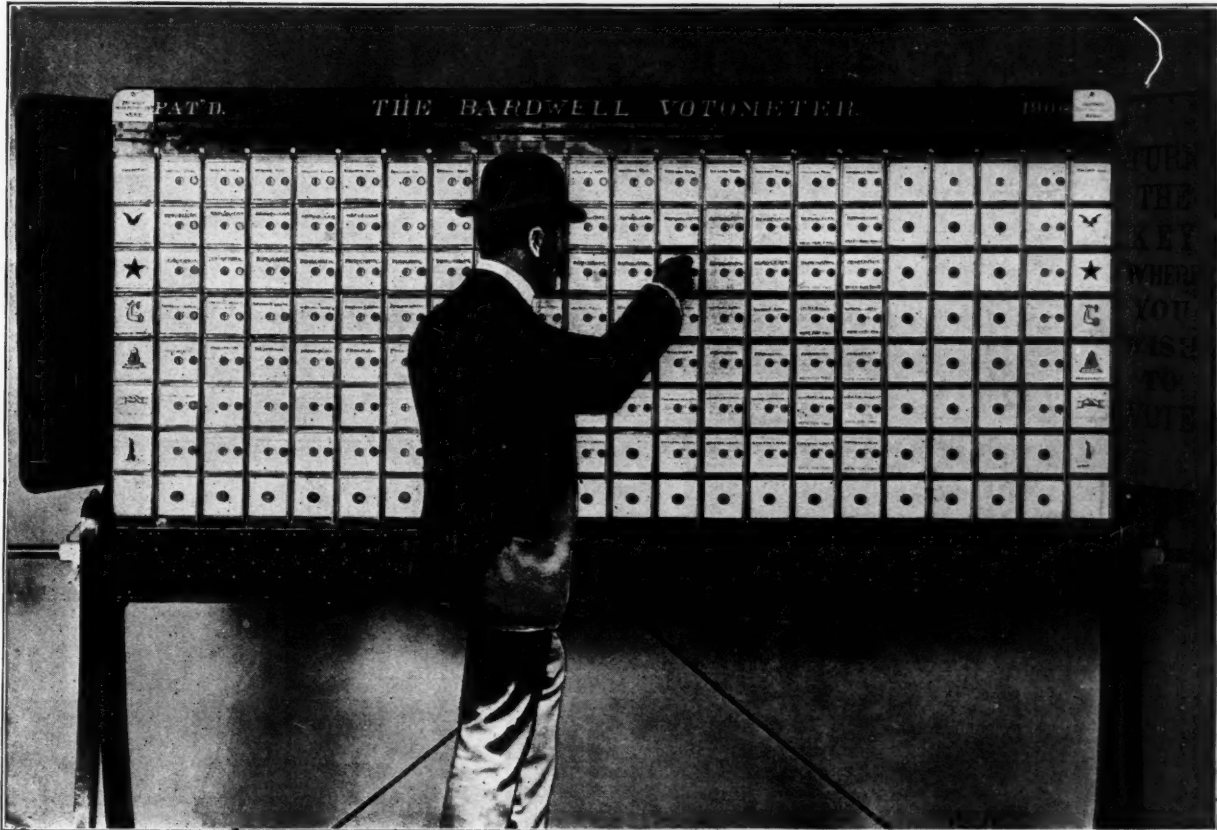
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THE ONLY VOTING MACHINE WHICH HAS REDUCED THE
NUMBER OF BLANK VOTES IN AN ACTUAL ELECTION. ❖ ❖

— FLEXIBLE, SIMPLE, ACCURATE AND EXPEDITIOUS. —

ABSOLUTELY PREVENTS FRAUD, ERRORS AND NECESSITY OF RECOUNTS.



BUILT ON UNIT SYSTEM, SECTIONAL CONSTRUCTION, POSITIVE MECHANICAL ACTION.
ADAPTABLE TO THE ELECTION LAWS OF ALL STATES.

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SANITARY STREET CLEANER

HAS THREE CLAIMS UPON THE PUBLIC

SPRINKLES,
SWEEPS AND
CARTS AWAY
THE DIRT
WITHOUT THE
AID OF
HAND LABOR.



ECONOMY,
SANITATION
AND
THE
ELEVATION
OF
LABOR.

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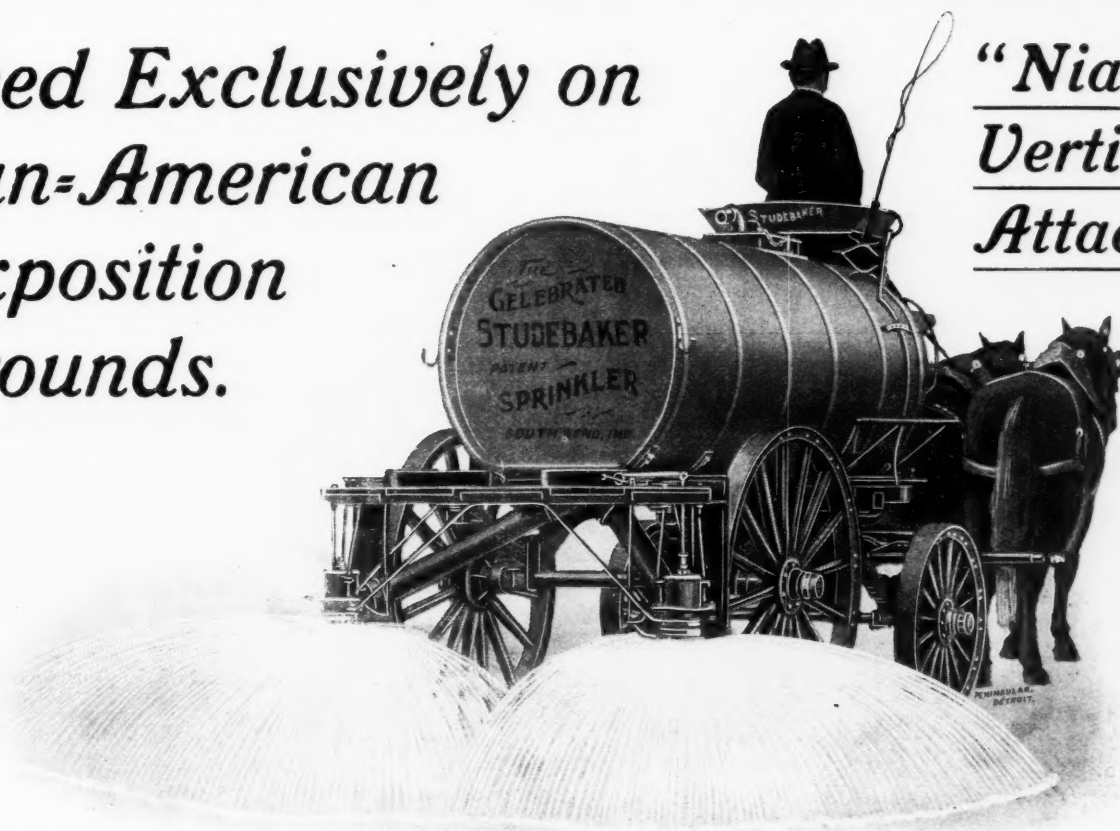
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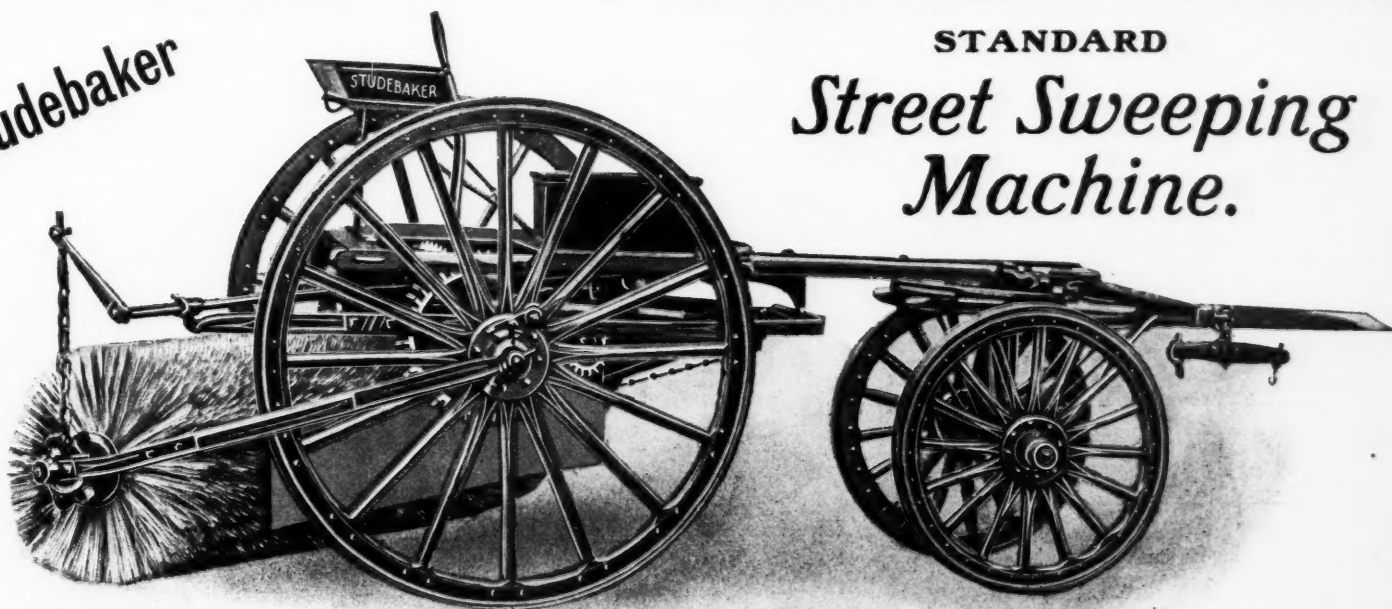


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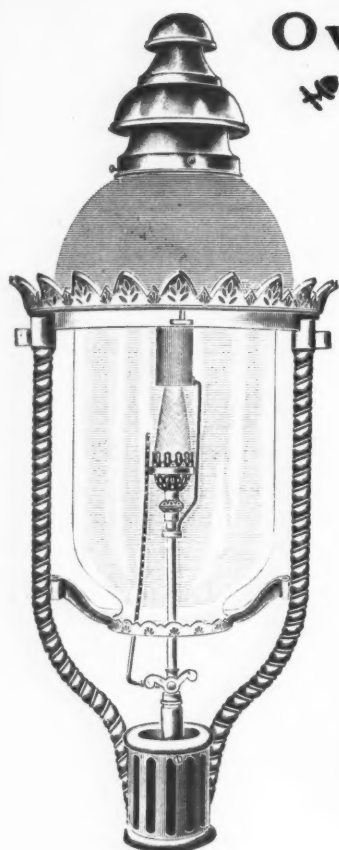


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Branches: New York City, Boston, Chicago, Kansas City, San Francisco, Portland, Ore.; Denver, Salt Lake City.

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LAMPS.

WE are the only company who manufacture an Incandescent Street Lamp with an outside Pilot Light and SELL them OUTRIGHT. : : : :

WHAT WE CLAIM:

1. We sell our Lamps outright at one-half the amount you pay other companies for rental.
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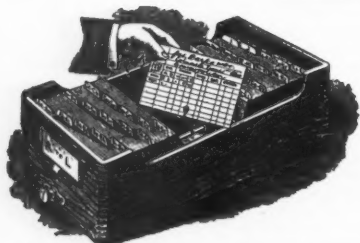
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"A finger touch finds the reference"

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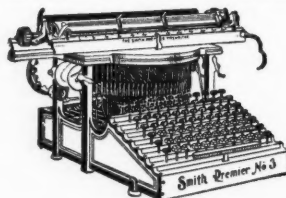
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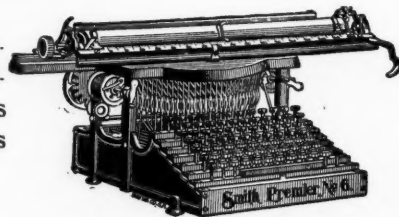
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No. 81.



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GLOBE LIGHT AND HEAT COMPANY,
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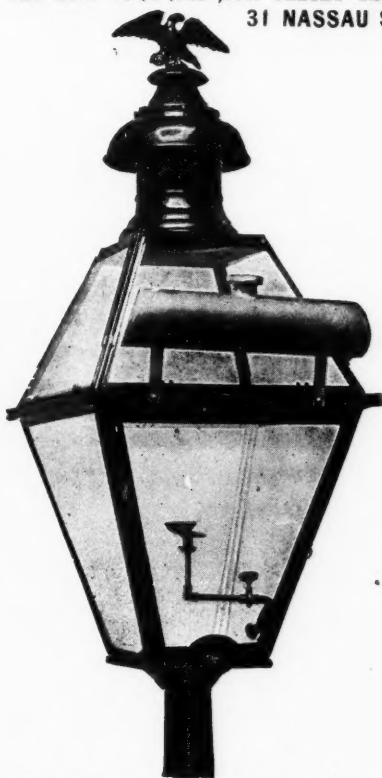
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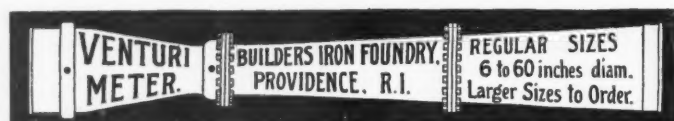
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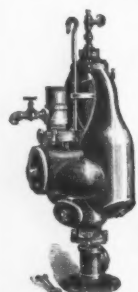
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PITTSBURG METER CO.,
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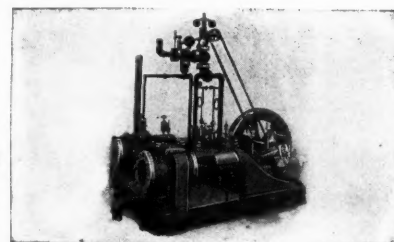
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Compressors,
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See other pages in this Magazine.

INDEX TO ADVERTISERS ON PAGE 6.

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COMPANY**

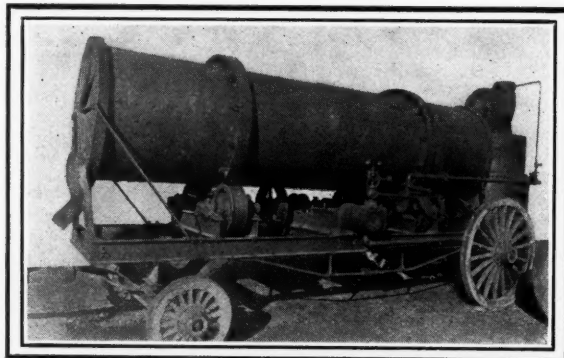
MUNICIPAL JOURNAL AND ENGINEER

SOME DEPARTMENTS OF THE WARREN SYSTEM

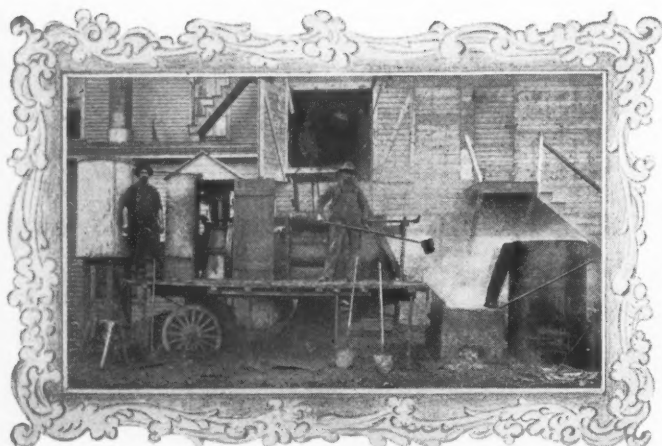
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Portable Bituminous Concrete Mixer.

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TWO PLY ROOFING FELT.
THREE PLY ROOFING FELT.
WATERPROOFING SEAL.
WATERPROOFING COMPOSITION.



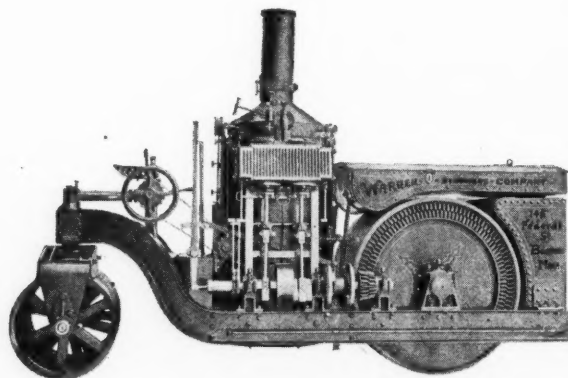
ASPHALT PAINTS AND VARNISHES.
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PURITAN BRAND PERFECT SIDEWALK
COMPOSITION.
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MACADAM COMPOSITION.

*Kiola Brand Natural Asphalt Paving
.... Cement*

*Owners of Wainwright Patent Steel
Edge Curb for New England.*

We are Contractors for :

BITUMINOUS MACADAM PAVEMENTS.
BITUMINOUS SIDEWALKS.
ASPHALT SIDEWALKS, FLOORS and DRIVEWAYS.
KIOLITHIC ARTIFICIAL STONE WALKS, DRIVES,
STEPS, COPINGS and any class of Concrete Structural
Work.
WARREN'S PATENT LAID "KIOLITHIC" ARTI-
FICIAL STONE CURB, with Galvanized Steel Guard.



****We do not Lay Asphalt Street Pavements****

WARREN BROTHERS COMPANY, 143 FEDERAL ST., BOSTON, MASS.

See other pages in this Magazine.

INDEX TO ADVERTISERS ON PAGE 6.

SCIENTIFIC PAVEMENT CONSTRUCTION.

In order to lay bituminous pavements of any class, it is absolutely necessary to have:

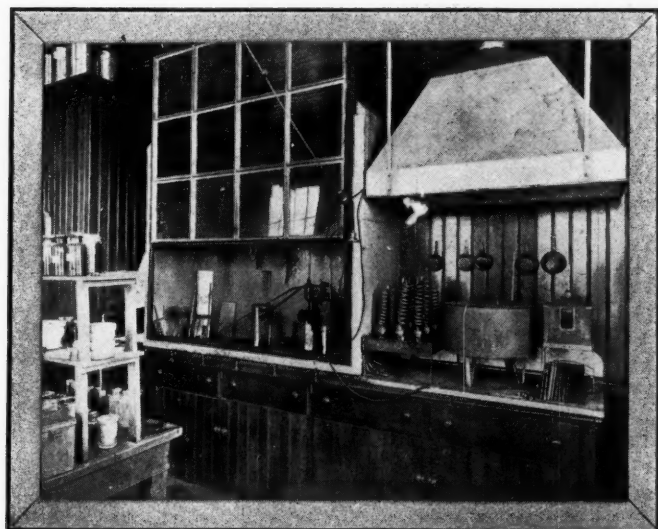
FIRST—An accurate knowledge of the requirements of each particular case.

SECOND—The knowledge of the physical and chemical characteristics of the materials to be dealt with.

THIRD—Knowledge of how to combine these materials to secure the best results under the conditions present, and

FOURTH—The skill to construct the pavement, consistent with this knowledge.

In order to arrive at an accurate knowledge of the requirements of each case, it is absolutely necessary to have a wide and varied experience in this class of construction, for a slight variation from the proper course in the proportions or treatment of the materials for a particular case is liable to cause failure.

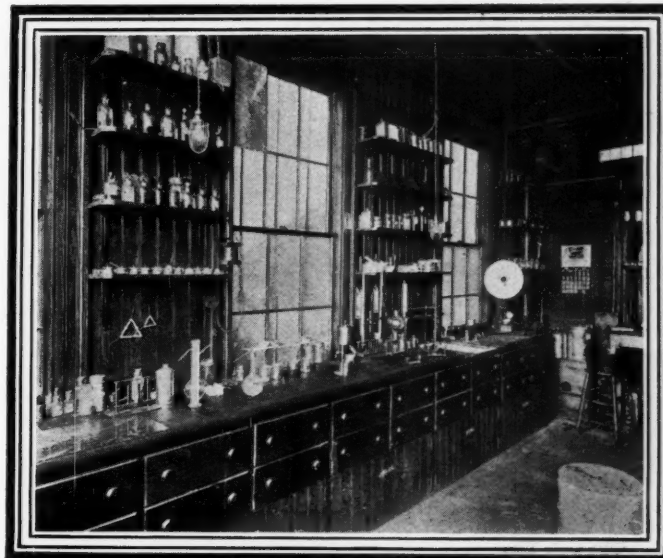


VIEW IN LABORATORY

The physical characteristics of the sand and stone available, and the physical and chemical properties of the bitumen to be dealt with, can only be determined by careful and systematic laboratory experiments, and these investigations are absolutely essential to good results.

The proportions in which the materials should be combined can be determined only after the laboratory examinations have been made, and after the proportions have been determined, care and skill in the preparation and laying the materials are absolutely essential.

Our Chemical laboratory is one of the most modern, and best equipped of any in the United States, for the analysis and examination of bituminous paving materials, and as we manufacture and refine our own bitumens, knowing the conditions present at any particular place,



VIEW IN LABORATORY

we are able to produce a bitumen which will exactly fulfill the requirements which we find by experience, to be required for the particular conditions under which the work is to be done.

Chemical results are useless and often misleading in the hands of the inexperienced.



VIEW IN LABORATORY

WARREN BROTHERS COMPANY, 143 FEDERAL ST., BOSTON, MASS.

See other pages in this Magazine.

INDEX TO ADVERTISERS ON PAGE 6.

PAVEMENTS WHICH HAVE BEEN LAID RIGHT.

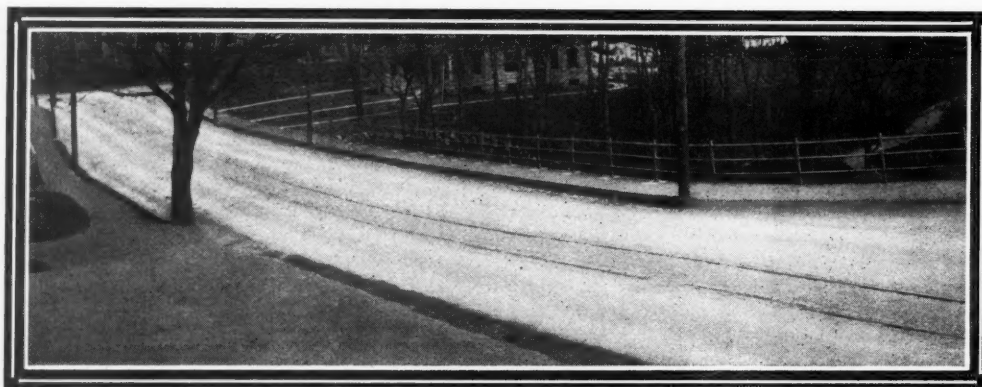


Bituminous Driveway in the rear of Bigelow School, Newton, Mass.
Laid by Warren Brothers Company.



Asphalt Roadway on bridge over the
Boston and Albany Railroad, at
Brookview, Mass.

Laid by Warren Brothers Company.



Walnut Street, Newtonville, Mass.
Bituminous Concrete laid by Warren Bros. Co.



Bituminous Macadam, laid at Factory of Warren Brothers Company, Cambridge, Mass. It was put in immediate use when laid and had sustained daily teaming loads up to six tons for a month when these photographs were taken. Voids in stone all filled.

WARREN BROTHERS COMPANY, 143 FEDERAL ST., BOSTON, MASS.

See other pages in this Magazine.

INDEX TO ADVERTISERS ON PAGE 6.

THE ARGUMENT.

A little knowledge is certainly a dangerous thing, and especially so in bituminous pavement construction. There is more chance of waste in the construction of this class of work, than in any other form of municipal improvement. Proper materials, improperly handled, or improper materials right handled will produce but one result, and that is a continued source of annoyance and expense to the property owners.

Don't condemn this class of pavement because you have seen poor ones laid by improper methods; the fact that some bituminous concretes have been down as long as thirty-two years, and are in good condition to-day, is sufficient proof that good pavements CAN be laid by the use of proper methods and materials. Our long experience in this class of construction, taken with the systematic chemical analysis of the good and bad pavements, justifies our claim that we know how, and do lay pavements which will uniformly have a long life.

It costs but little more to lay a pavement the right way, than it does the wrong way, and hence it does not pay to use uncertain materials, or to deal with inexperienced men.

The failures from improperly using Tar, Asphalt and other Bitumen are legion.

"Be sure you are right and then go ahead." That "Be sure you are right" is worth something to you, and you can have it by dealing with

WARREN BROTHERS COMPANY,

143 Federal Street, BOSTON, MASS.

EXPLANATION OF BITUMINOUS MACADAM.

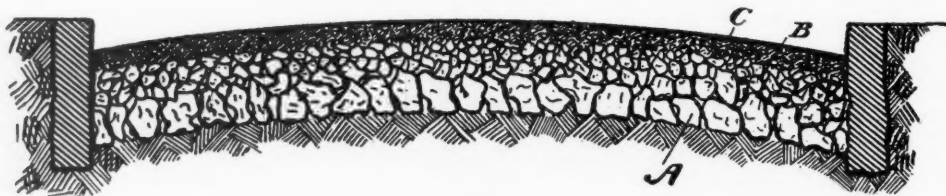


Fig. 1.

FIG. 1 represents a section of a roadway with a Macadam or Telford foundation laid in the usual manner, and with a wearing surface composed of coarse stones, the voids of which are entirely filled with finer stone and sand and bitumen. Owing to the rigidity obtained from the use of large sized stones, we obtain a firmness independent of that due to the bitumen, and hence we are enabled to use a much softer bitumen than is otherwise practicable, and owing to the density of the mass, the essential oils are protected from the direct action of the elements, which insures long life ; and the bitumen will not harden up to the consistency of that ordinarily used in asphalt pavements for ten or fifteen years, and it is then only where the ordinary pavement starts its life.



The Roadway is Especially Suitable for Small Communities, BECAUSE

- 1st. It does not require expensive machinery to apply.
- 2d. It combines all of the best qualities of macadam.
- 3d. It is waterproof, reducing to a minimum the necessity of heavy foundation.
- 4th. It will reduce or do away with dirty streets.
- 5th. It will save 25 per cent. of the expense of street sprinkling over macadam, or do away with the necessity of sprinkling entirely.
- 6th. It will present a gritty surface and a firm hold for horses.
- 7th. The bituminous materials can contain so much of their essential oils that can be evaporated by age before going into decomposition, and still maintain hardness of wearing surface, and remain flexible enough to cement the stones together until they will wear out under moderate traffic.
- 8th. It can be surfaced from time to time with moderate cost.
- 9th. At the present average price of a first-class pavement we will construct, with a twenty year guarantee on streets of moderate travel. Payments 50 per cent. cash and balance $2\frac{1}{2}$ per cent. each year for twenty years.
- 10th. Every town should arrange to coat their macadam with bitumen and get the work at first cost.
- 11th. It will increase the service of macadam roads three to four times.
- 12th. It can be used for resurfacing old macadam to great advantage.

WARREN BROTHERS COMPANY, 143 FEDERAL ST., BOSTON, MASS.

See other pages in this Magazine.

INDEX TO ADVERTISERS ON PAGE 6.

THE WRONG WAY. Illustrations of Defective Work.



View of Bituminous walks in Broadstreet Ave., Revere, Mass., showing the effect of laying this class of Pavement by the rule of thumb.



King William Street, between Houston and John Streets, Hamilton, Ont., showing the result of haphazard methods in the construction of Bituminous Macadam, and selection of ingredients. Laid 1893. Stood for 7 years. Relaid 1900. Photo taken 1901.



The lower view shows the effect of using worthless Bitumen.

Bituminous concrete walks, Atlantic Avenue, Beachmont, Mass.



Asphalt driveway to Riverbank Court building, Cambridge, Mass., laid November, 1900, photograph taken April, 1901. It illustrates how a first-class Asphalt can be ruined when laid by haphazard methods.

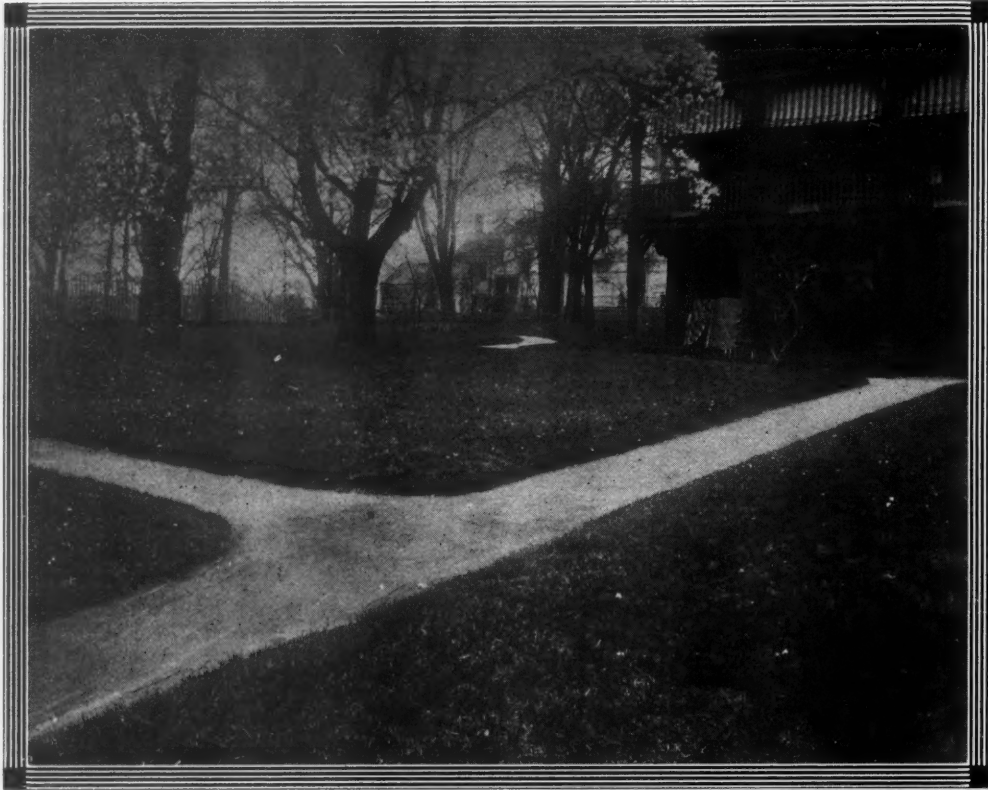
WARREN BROTHERS COMPANY, 143 FEDERAL ST., BOSTON, MASS.

See other pages in this Magazine.

INDEX TO ADVERTISERS ON PAGE 6.

THE PROOF OF THE PUDDING

Illustrations of Bituminous Pavements which have been in use twenty years or more.

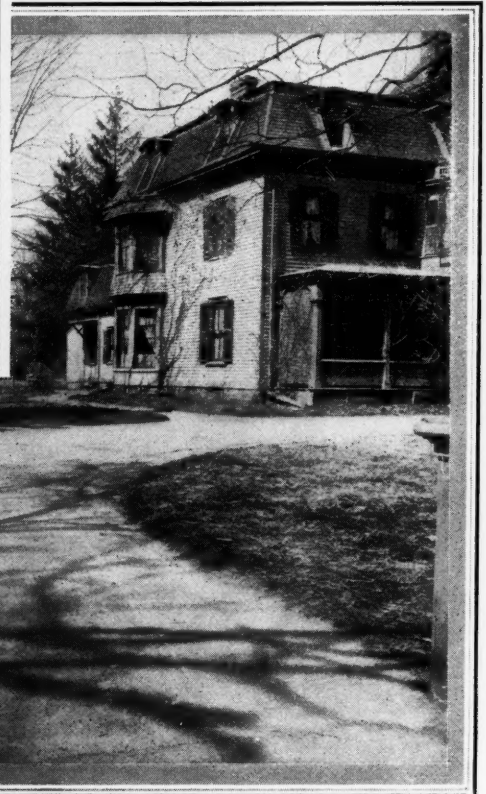


(1)

(1) Bituminous Walks in the rear of the residence of Prof. Cyrus M. Warren, Brookline, Mass., thirty-two years old. No repairs.

(2) Bituminous concrete Driveway at residence of Mr. F. S. Rollins, Newtonville, Mass.

Laid in 1880. No Repairs.



(2)



(3)

(3) Bituminous concrete on Chestnut Street, West Newton, Mass., in front of residence of Albert C. Warren, Vice-President Warren Brothers Company.

Laid in 1874.

Repaired in 1900 by Warren Brothers Company.

WARREN BROTHERS COMPANY, 143 FEDERAL ST., BOSTON, MASS.

See other pages in this Magazine.

INDEX TO ADVERTISERS ON PAGE 6.

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Main Office, 143 Federal Street. Boston, Mass.



MANUFACTURERS AND DEALERS IN ALL KINDS OF COAL TAR AND ASPHALT PRODUCTS FOR USE IN ALL CLASSES OF WORK EXCEPT ASPHALT STREET PAVING;

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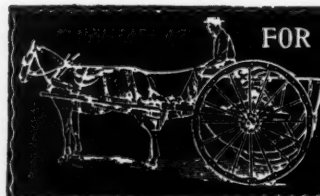
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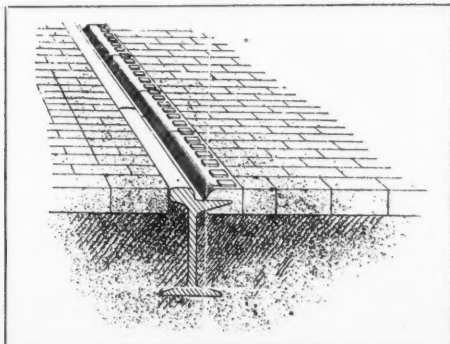
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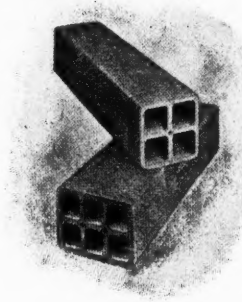


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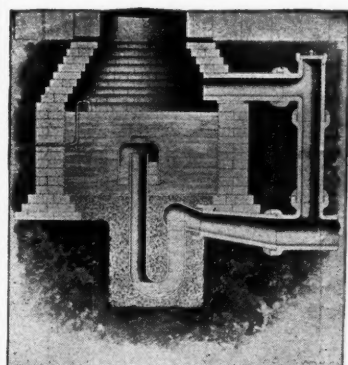
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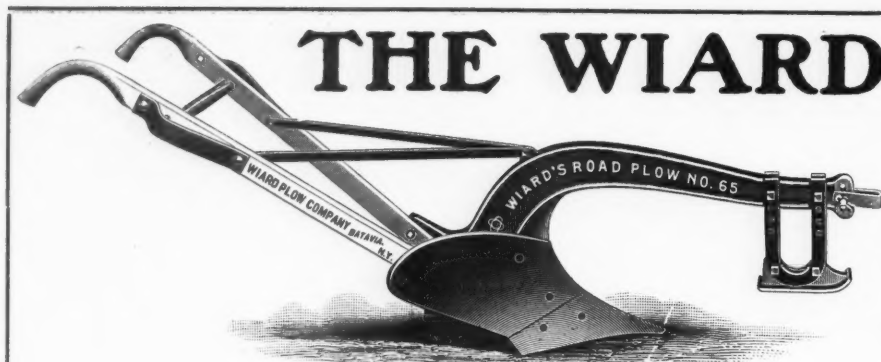


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ARE
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COMPEL
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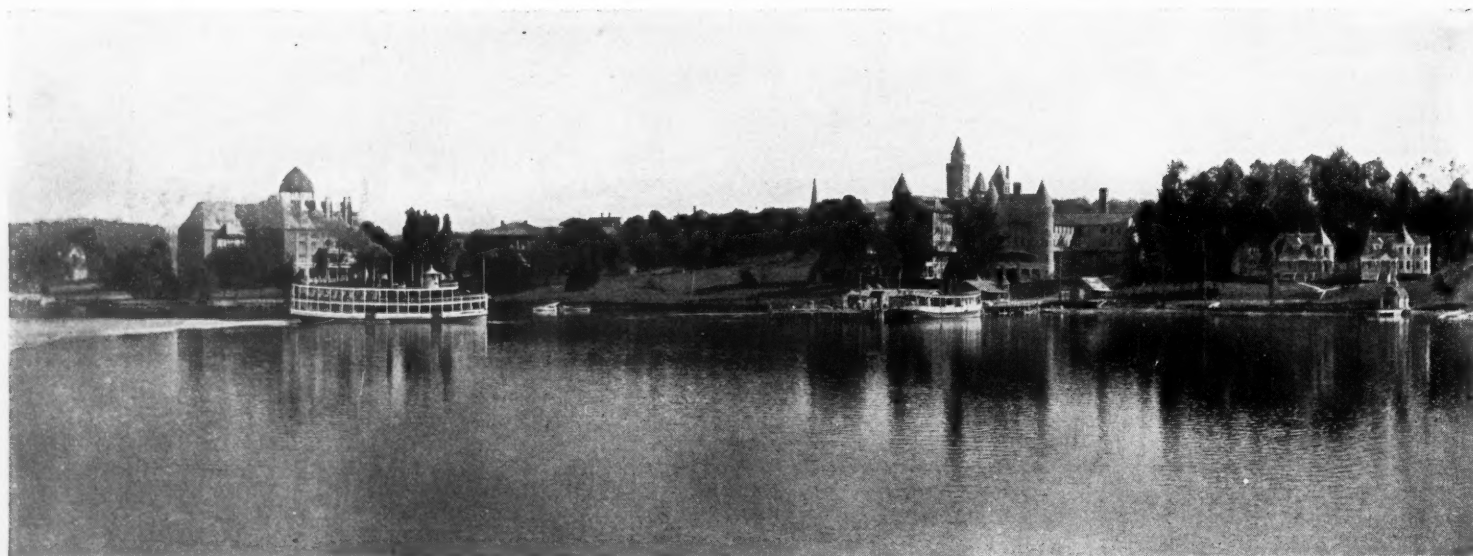
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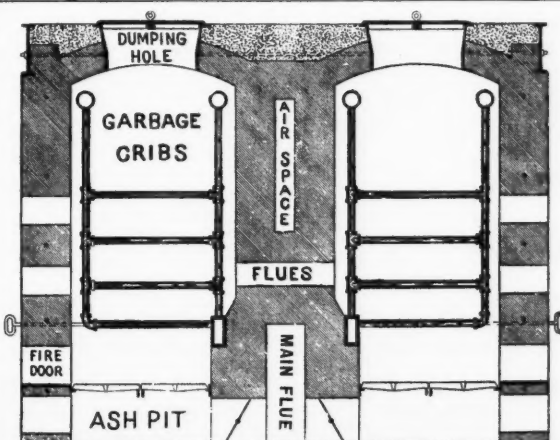
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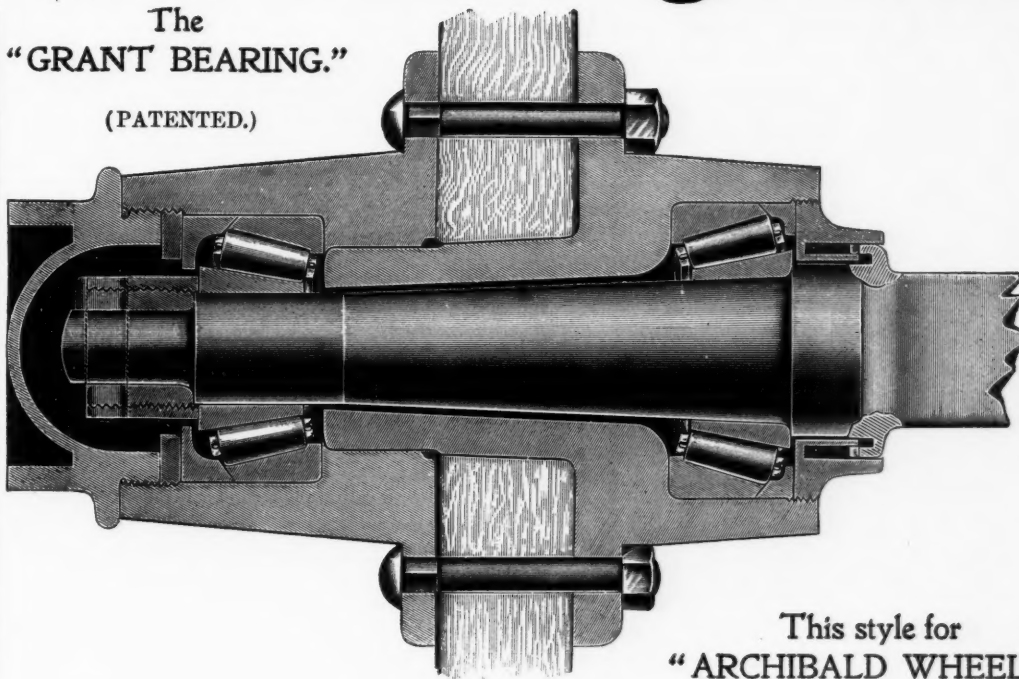
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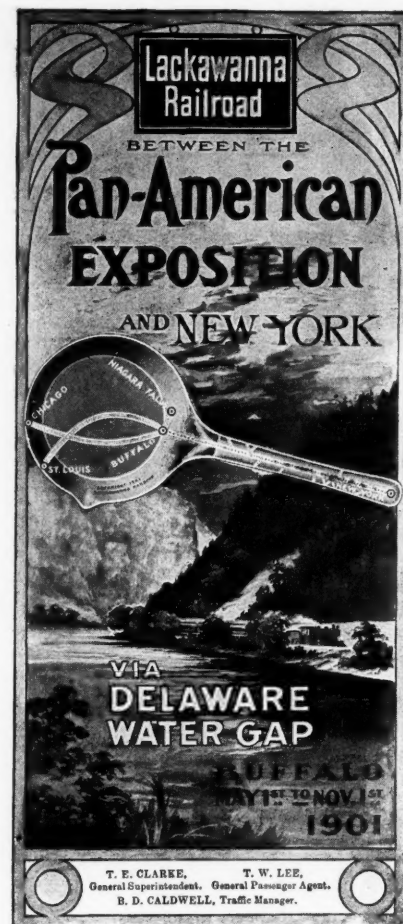
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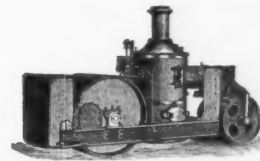
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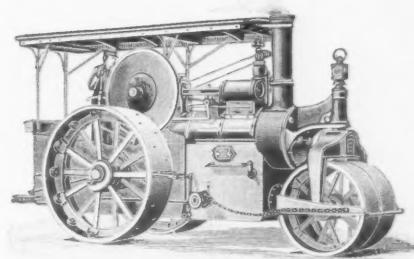


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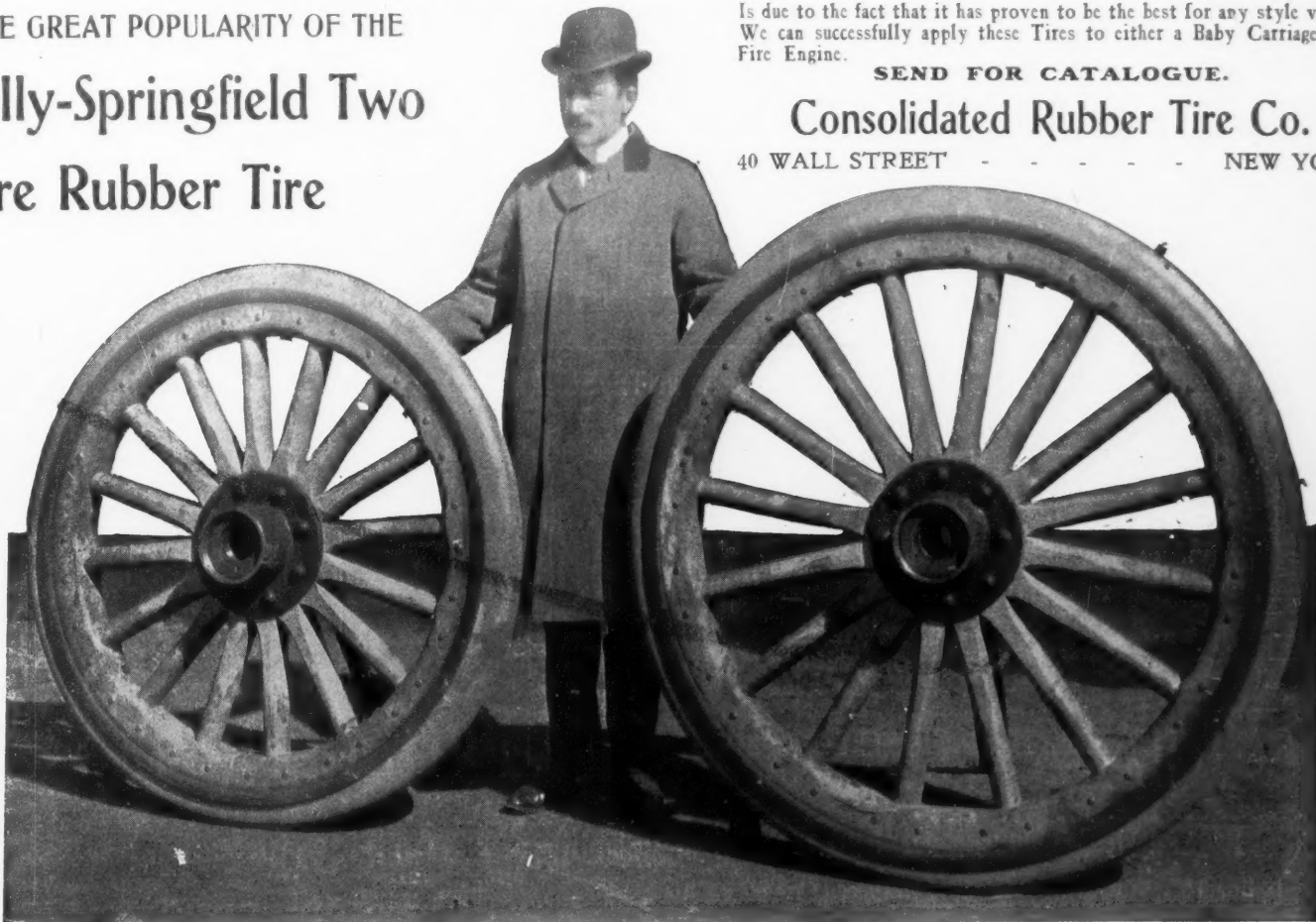


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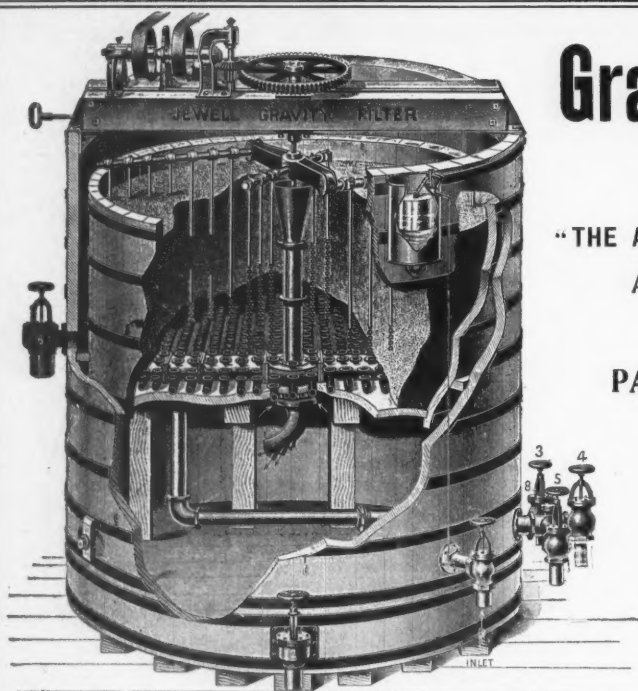
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